Non-pharmacological prevention of delirium in older adults in long term care: A scoping study

by

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Abstract

Background: Non-pharmacological multicomponent interventions for the prevention of delirium have been well studied in the acute care setting. Less is known however, regarding this approach in long term care environment.

Aim: The purpose was to systematically synthesize evidence pertaining to non-pharmacological nursing interventions for the prevention of delirium among older adults residing in long term care settings.

Methods: This study used a scoping review methodology guided by Arksey and O'Malley's (2005) framework. A total of eight academic databases were searched. In addition, reference lists, clinical guidelines, and key journals were searched. To ascertain the nature of the extracted data from reports meeting specific inclusion criteria, descriptive numerical data analysis methods were used.

Findings: Results revealed a total of 13 reports; two clinical guidelines, one systematic review, and 10 primary studies. The reviewed evidence examined single rather than multicomponent interventions for the prevention of delirium in the population of interest. Collectively, the heterogeneous and mixed findings addressed hydration, risk reduction and education of staff.

Conclusion: The results were stark in contrast to the established body of work regarding non-pharmacological multicomponent approaches in acute care.

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Chapter 1

Introduction

The number of persons above the age of 65 years in Canada was estimated at nearly five million, which accounted for 14.8% of the country's population (Government of Canada, 2011). By the year 2030, it is predicted that nearly one in every four Canadians will be over the age of 65 years (Statistics Canada, 2014). Presently 200,000 Canadians reside in long term care (LTC) and by the year 2041, it is estimated that 320,000 Canadians will require LTC services (Canadian Institute for Health Information, 2013; McGregor & Ronald, 2011). Generally, individuals requiring LTC are 85 years or older, have multiple co-morbidities, do not require hospitalization but need support and assistance with activities of daily living and 24 hour nursing supervision that cannot be fulfilled by visiting home care programs or retirement homes.

Considering that seniors over 85 years of age are the fastest growing cohort (Canadian Institute for Health Information, 2011), and most likely will require LTC services, it is not surprising that this population is vulnerable to an interplay of health, social and cultural variables. An increasing health concern is attending to the mental well-being of older adults. Delirium, an alteration in cognitive processes, can occur at any time during one's life, however it is more prevalent among the elderly (Inouye, Westendorp, & Saczynski, 2014; Martins, Simoes, & Fernandes, 2012; Neville, 2006). Although delirium is a highly preventable adverse condition for older persons, the reported prevalence of delirium in residents of LTC was 70% (Cole et al., 2014; McCusker et al., 2013).

Delirium has been described for more than 2500 years, since the time of ancient Greek and Roman physicians (Coulson & Almeida, 2002; Inouye et al., 2014; Siddiqi, House, & Holmes, 2006). Field and Wall (2013) presented a comprehensive historical overview of the

development of thinking and science relative to delirium. The origins of this health challenge are attributed to Hippocrates around 500 Before Common Era (BCE) as two syndromes called 'phrenitis' and 'lethargus.' The syndrome of phrenitis consisted of an acute onset of behavioural changes, sleep disturbances, and cognitive deficits. It was commonly associated with the development of a fever. Alternately, lethargus was described as inertia and a dulling of the senses. These authors identified that Celsus, around the first century, documented clusters of symptoms similar to delirium that were not caused by a fever. Subsequently during the medieval period, Procopius noted hallucinations that preceded the syndrome and described hyperactive and hypoactive types, which are still used today. By the mid to late 18th century, scholars attributed delirium pathophysiology to inflammation associated with altered sleep patterns, and classified delirium without fever as mania. In the 19th century, understanding of delirium expanded from a disorder of thinking to also include disturbances of perception or impaired consciousness. Most recently, in the early 20th century, Pickett postulated that delirium in the ill and confusion in the elderly should be considered separately. In addition, Pickett postulated that delirium has an organic cause, whereas confusion could be exhibited from non-organic causes (Field & Wall, 2013).

According to Lawlor et al. (2014), the International Classification of Diseases-10 (ICD-10) and the Diagnostic and Statistical Manual of Mental Disorders-V (DSM-V) criteria are considered the gold standards in diagnosing delirium in contemporary society. In addition, published authors typically described delirium as a cognitive disorder with specific clinical features including acute or rapid onset, fluctuating course and disturbances in consciousness, orientation, memory, thought, perception and/or behaviour (Cole et al., 2014; Irwin, Pirrello, Hirst, Buckholz, & Ferris, 2013; Thomas et al., 2014; Tsai, Chou, Tsai, Hung, & Su, 2013). At

present, there is no testing to positively confirm the diagnosis of delirium. Diagnosis is predicated upon clinician completion of a thorough health assessment, informed by standardized criteria, observations, medication review, and information input from those close to the individual (Inouye et al., 2014; Lawlor & Bush, 2014; McCusker et al., 2011; Rathier & Baker, 2011; Sendelbach & Finch-Guthrie, 2009). A diagnosis of delirium provides clinicians a foundation upon which to further examine potential risk factors and develop individualized interventions based on their unique risk factors discovered.

There is substantive literature describing the classification of delirium based on its psycho-motor presentation. Three subtypes of delirium have been described as hyperactive, hypoactive, and mixed forms, which subject individuals to variable health consequences (Field & Wall, 2013; Inouye et al., 2014; Irwin et al., 2013; Schofield, Tolson, & Fleming, 2012; Yang et al., 2009). Hyperactive delirium is characterized by restlessness, constant movement, agitation, hallucinations, inappropriate behaviours, increased psychomotor activity, increased alertness, fast or loud speech, irritability, combativeness, euphoria, anger, wandering, swearing, uncooperativeness, easily startled, fast motor responses, nightmares, psychosis, and paranoia (Arinzon, Peisakh, Schrire, & Noam Berner, 2011; Bond, 2009; Schofield et al., 2012; Yang et al., 2009). The hyperactive subtype of delirium is estimated to account for up to 30% of all cases (Coulson & Almeida, 2002; Field & Wall, 2013). Individuals with hyperactive delirium are more likely to be disruptive and pose recognizable potential risks to themselves or others (Bond, 2009; Field & Wall, 2013; Yang et al., 2009).

Hypoactive delirium has been described as a ‘silent’ condition despite its severity and grave prognosis (Andrew, Freter, & Rockwood, 2005; Inouye et al., 2014; Voyer, McCusker, Cole, & Khomenko, 2006; Yang et al., 2009). Those afflicted with hypoactive delirium may

exhibit unawareness, decreased alertness, inattentiveness, sparse or slow speech, lethargy, slow movements, apathy, unresponsiveness, psychomotor retardation, and altered sleep-awake cycles (Arinzon et al., 2011; Schofield et al., 2012; Yang et al., 2009). It has been proposed that this type of delirium is under-detected given that its symptomology can overlap with dementia and depression (Eeles & Rockwood, 2008; D. Fick & Mion, 2007; Flagg, Cox, McDowell, Mwose, & Buelow, 2010; Landreville, Voyer, & Carmichael, 2013). It is estimated that hypoactive delirium accounts for up to 40% of all cases (Coulson & Almeida, 2002; Sandberg, Gustafson, Brannstrom, & Bucht, 1999).

Mixed delirium involves the combination of features from both hyper- and hypo-active delirium. It is characterized by fluctuating symptomology (Arinzon et al., 2011; Eeles & Rockwood, 2008; Schofield et al., 2012). This form is thought to be the most common of the three subtypes of delirium and can account for 50% of all cases (Coulson & Almeida, 2002).

Recent literature examines the numerous risk factors associated with delirium, predominantly in the acute care setting (Cacchione, Culp, Laing, & Tripp-Reimer, 2003; Coulson & Almeida, 2002; Hempenius et al., 2011). Delirium risk factors are classified as either predisposing or precipitating (Halloway, 2014; Voyer, Richard, Doucet, Cyr, & Carmichael, 2010). Predisposing risk factors are present at baseline or at hospital admission and are known to increase the risk of delirium (Halloway, 2014; Inouye & Charpentier, 1996). Specific to an elderly population, these may include vision impairment, severe illness, cognitive impairment, and dehydration (Inouye, 2000). For older adults in LTC, Voyer and colleagues (2010) identified the following predisposing factors: advanced age, severity of dementia, level of functional autonomy, pain, depression, behavioural disturbances, number of medications prescribed, dehydration, fever, and malnutrition.

Dementia is recognized as a common predisposing factor. The prevalence of delirium superimposed on dementia was estimated between 22 and 89% (D. M. Fick, Hodo, Lawrence, & Inouye, 2007; Landreville et al., 2013; Voyer, Richard, Doucet, & Carmichael, 2011). Dementia is described as a neurodegenerative disease that has a progressive and gradual deterioration in memory, physical, cognitive, and social abilities (Arinzon et al., 2011; Duffin, 2010; D. Fick & Foreman, 2000; Voyer et al., 2006). It is estimated that there are over 35 million individuals worldwide diagnosed with a form of dementia, and given the aging population, this number is expected to increase to more than 100 million by 2050 (Kolanowski, Mulhall, Yevchak, Hill, & Fick, 2013). Specific to Canadian LTC facilities, three in five individuals have a medical diagnosis of dementia (Canadian Institute for Health Information, 2013).

The presence of dementia predisposes an individual's risk for delirium by a multiple of six (Voyer, Richard, Doucet, Cyr, & Carmichael, 2011). Delirium superimposed on dementia is associated with heightened negative patient outcomes. These include more frequent and severe cognitive impairments, accelerated trajectory of dementia, increased mortality, increased risk for falls, increase health care utilization and costs, and functional decline (Cole et al., 2014; Landreville et al., 2013; O'Hanlon et al., 2013; Yevchak et al., 2014). Tsai et al. (2013) noted that individuals with delirium superimposed on dementia had more than a two-fold risk of mortality when compared with those with dementia alone, or neither delirium or dementia. Negative patient outcomes and service implications when delirium is superimposed on dementia may be related to the complexity of differentiating diagnoses of delirium and dementia and thus planning appropriate interventions (Yang et al., 2009). A tendency to associate delirium with dementia, depression, and a normal part of the aging process have the potential to compromise care (Day, Higgins, & Keatinge, 2011; Schofield et al., 2012).

Precipitating factors are defined as noxious insults or environment-related factors (Inouye & Charpentier, 1996; Leentjens & van der Mast, Rose C., 2005). Five precipitating factors, specific to elderly acute care populations, include use of physical restraints, malnutrition, the addition of three or more medications on the previous day, use of an indwelling urinary catheter, and any iatrogenic event (Inouye, 2000). A study reported that precipitating factors for delirium in LTC were the use of physical restraints, level of sensory stimulation, and adequacy of the physical environment (Voyer et al., 2010). Less is known, however, about the interplay between predisposing and precipitating factors for delirium amongst the elderly LTC population (Cole et al., 2013). As such, opportunities for early delirium prevention may be missed (Cole et al., 2013; Flagg et al., 2010)

It has been recognized that delirium is rarely caused by a single risk factor (Halloway, 2014; Milisen, Lemiengre, Braes, & Foreman, 2005) . In order to demonstrate the complex and dynamic relationships between predisposing and precipitating factors for delirium and an individual's vulnerability to the development of delirium, a multi-factorial model was developed (Inouye & Charpentier, 1996; McCurren & Cronin, 2003). This predictive model was subsequently validated through research in the general medicine acute care setting (Inouye & Charpentier, 1996; Laurila, Laakkonen, Valdemar Laurila, Timo, & Reijo, 2008; O'Hanlon et al., 2013). This model illustrated that an individual who was vulnerable at baseline, or had a number of predisposing risk factors, was more likely to develop delirium when exposed to minimal precipitating factors. Contrarily, an individual who had few precipitating risk factors required to be exposed to several precipitating factors in order to develop delirium (Inouye & Charpentier, 1996; Leentjens & van der Mast, Rose C., 2005; MacLeod, 2006; Siddiqi, Holt, Britton, & Holmes, 2007).

It is necessary for health care professionals to recognize the value of implementing a multicomponent intervention (Flagg et al., 2010; Inouye et al., 2014; Thomas et al., 2014). Such an approach, tailored to the specific risk factors of adults, allows for evidence-informed detection and management. Although multicomponent interventions involve a multi-disciplinary team, nurses play a pivotal role in implementation and coordination (Khan et al., 2012; Milisen et al., 2005; Rosenbloom-Brunton, Henneman, & Inouye, 2010; Siddiqi et al., 2007). The associated outcomes of a multicomponent approach include prevention of delirium in at-risk individuals, decreased duration of delirium, shortened length of acute care stay, decreased mortality, and lowered overall healthcare costs (Benedict et al., 2009; Holt, Young, & Heseltine, 2013; Martinez, Tobar, Beddings, Vallejo, & Fuentes, 2012; Vidan et al., 2009).

Prevention, inclusive of early detection of delirium, is considered best practice. The varied and diverse multicomponent intervention programs have been extensively studied in acute services. Numerous best practice guidelines and systematic reviews of delirium multicomponent interventions are available. Across this evidence is the recommendation for the prevention of delirium to optimize the outcomes for individuals, their families, and the health care system (Benedict et al., 2009; Day, Higgins, & Koch, 2009; Gagnon, Allard, Gagnon, Merette, & Tardif, 2012; Siddiqi et al., 2007). Some researchers suggest that early symptom identification can lead to prevention in nearly a third of delirium cases (Day et al., 2009; Rosenbloom-Brunton et al., 2010). Early detection can truncate delirium as many may go undiagnosed for an extended period of time (C. P. Anderson, Ngo, & Marcantonio, 2012; Inouye, 2006; McAvay et al., 2006; Popp, 2013).

Less is known about multicomponent interventions for delirium for older adults residing in LTC settings. This knowledge gap is an identified concern given that the resident population

of LTC is vulnerable. Over 60% of Canadian residents are greater than 75 years of age (McGregor & Ronald, 2011). In addition, residents in LTC live with complex health presentations, an average of six co-existing conditions, immobility secondary to chronic pain, depression, advanced dementia, malnutrition, poly-pharmacy, dehydration, and malnutrition (Arinzon et al., 2011; Boockvar, Signor, Ramaswamy, & Hung, 2013; Halloway, 2014; McCusker et al., 2013; Voyer et al., 2010). Furthermore, LTC residents are more likely to be exposed to precipitating risks factors such as the use of physical restraints, decreased level of sensory stimulation, inadequacy of physical environment, and inadequate supports for service providers (Canadian Institute for Health Information, 2013). Bond (2009) stressed the great importance that all health care providers are able to recognize symptoms of delirium as it can be prevented.

Prevention of delirium involves the identification of a resident's risk factors for delirium and if necessary, the implementation of appropriate non-pharmacological interventions to address and eradicate the risks prior to the exhibition of symptoms (Inouye, 1999; S. Robinson et al., 2008; Sendelbach & Finch-Guthrie, 2009). Management of delirium focuses on the reduction of presenting risks while simultaneously providing supportive care, non-pharmacological interventions, and treatment of any identified medical cause (Day et al., 2011; Neville, 2008; Schofield, 2008). If delirium becomes recognized as the sixth vital sign (Flaherty et al., 2007; Morley, 2008; Voyer et al., 2014) by care providers in LTC, this may strengthen evidence informed prevention and management practices.

In summary, current evidence, contextualized within acute care settings, demonstrates the health and social benefits of utilizing non-pharmacological multicomponent interventions to prevent and manage delirium in the elderly population. The purpose of this scoping study is to

systematically synthesize the nature of evidence pertaining to non-pharmacological nursing interventions for the prevention of delirium among elderly residents in the LTC setting. Non-pharmacological interventions for the purpose of this study are defined as interventions that nurses can implement independently, without a physician's order, and did not involve the review or administration of pharmacological agents.

Chapter 2

Literature Review

This chapter presents a descriptive review of the literature about non-pharmacological multicomponent interventions to prevent delirium among older adults receiving acute medical, non-intensive care unit services within a hospital setting. This information serves to couch this study within an understanding of the complexity of delirium prevention. Multicomponent interventions, detailed in the individual reports, are summarized in tabulated and narrative formats.

A computerized search was undertaken in the following academic databases: Cumulative Index to Nursing and Allied Health Literature (CINAHL), Proquest, Evidence Based Medicine Review: EBMZ/Cochrane, MEDLINE, PubMed, PsycINFO, Joanna Brigg's Institute EBP Database, and National Guideline Clearinghouse. The search was not limited by healthcare discipline, however any identified intervention for delirium prevention had to be within the realm of nursing practice. The search parameters were: peer-reviewed; available electronically in full-text; and published in English. The single primary studies had to be published subsequent to January 2010. This criterion was set to identify any further evidence published in the years following the bulk of delirium prevention best practice guideline publications in 2010. The key word 'delirium' had to appear in either the report's title or abstract. In addition, the term 'multicomponent,' or similar terms, such as 'multi-faceted,' or 'bundle' had to appear in either the report's title or abstract. The search was refined through inclusion of studies that specifically involved older adult populations in acute medical hospital settings. In addition, those studies that exclusively addressed pharmacological interventions were eliminated from the reviewed literature. This search purposefully excluded any reports specific to LTC settings, the focus of

the scoping review presented in subsequent chapters. As the purpose of this descriptive literature review was to demonstrate the plethora of evidence published specific to the older adult in the acute care setting, rigor of the evidence was not assessed.

Using the identified search parameters, 16 best practice guidelines, published between 1998 and 2012, with a total of 912 recommendations were identified (Table 1). The Registered Nurses' Association of Ontario (RNAO) (2010a) and the National Institute for Health and Clinical Excellence (NICE) (2010) released prevention and management guidelines for hospitalized older adults with delirium. Given that both these resources presented evidence within their guidelines regarding non-pharmacological interventions specific for older adults in LTC, they will be discussed in subsequent chapters.

Table 1: *Clinical guidelines addressing non-pharmacological multicomponent interventions for delirium among elderly persons in hospital*

Lead author	Year	Title of the Guideline	Number of recommendations
National Guideline Clearinghouse	2012	Delirium: Evidence-based geriatric nursing protocols for best practice	23
Canadian Coalition for Seniors' Mental Health	2010	Guideline on the assessment and treatment of delirium in older adults at the end of life	165
National Institute for Health and Clinical Excellence (NICE)	2010	Delirium: Diagnosis, prevention and management	47
Registered Nurses' Association of Ontario (RNAO)	2010	Caregiving strategies for older adults with delirium, dementia and depression	42
Registered Nurses' Association of Ontario (RNAO)	2010	Screening for delirium, dementia and depression in older adults	11
National Guideline Clearinghouse	2009	Acute confusion/delirium	53
Sendelbach	2009	Evidence-based guideline: Acute confusion/delirium identification, assessment, treatment, and prevention	29
Michaud	2007	Delirium: Guidelines for general hospitals	30
Australian Health Ministers' Advisory Council	2006	Clinical practice guidelines for the management of delirium in older people	43
British Geriatrics Society	2006	Guidelines for the prevention, diagnosis and management of delirium in older people in hospital	19

Lead author	Year	Title of the Guideline	Number of recommendations
Canadian Coalition for Seniors' Mental Health	2006	National guidelines for seniors' mental health: The assessment and treatment of delirium	196
Potter	2006	The prevention, diagnosis and management of delirium in older people: Concise guidelines	15
Rapp	2001	Acute confusion/delirium protocol	79
American Psychiatric Association (APA)	1999	Practice guideline for the treatment of patients with delirium	18
Foreman	1999	Standard of practice protocol: Acute confusion/delirium	64
Rapp	1998	Research-based protocol. Acute confusion/delirium	78

The total number of systematic reviews pertaining to non-pharmacological multicomponent interventions for delirium among hospitalized older adults was 13 (Table 2). These reports were published between 1996 and 2015. Over nearly two decades, a body of evidence specific to the efficacy of non-pharmacological multicomponent interventions has been generated. The number of included studies within individual systematic reports ranged from zero to 31. It is noteworthy that a commonly cited publication, authored by Inouye and associates (1999), published the first multicomponent intervention protocol in an acute medical in-patient setting and has since been referred to as one of the most effective interventions (Vidan et al., 2009). This study described a multicomponent intervention program known as the Hospital Elder Life Program (HELP) which was based on specific predisposing and precipitating risk factors commonly seen in hospitalized acutely ill elderly.

HELP was based on the assumption that an individual with a high predisposing vulnerability required only a small insult for delirium to develop while those with a low predisposing vulnerability needed to be exposed to several and/or major insults for delirium to ensue (Leentjens & van der Mast, Rose C., 2005; Popp, 2013; Registered Nurses' Association of Ontario (RNAO), 2010a). The six major risk factors for delirium included cognitive impairment, sleep deprivation, immobilization, vision and hearing impairment, and dehydration (Canadian

Coalition for Seniors' Mental Health, 2006; Inouye et al., 1999; Milisen et al., 2005; National Institute for Health and Clinical Excellence (NICE), 2010; Zaubler et al., 2013). The interventions based on the above common risk factors involved orienting communication, therapeutic activities, sleep enhancement strategies, exercise and mobilization, provision of hearing and vision aids, and oral hydration (Inouye et al., 1999; Registered Nurses' Association of Ontario (RNAO), 2010a).

Table 2: *Systematic reviews addressing non-pharmacological multicomponent interventions for delirium among elderly persons in hospital*

Lead Author	Year	Purpose of review	Number of included studies
Abraha	2015	Review comparative studies concerning non-pharmacological intervention to treat or prevent delirium in older patients	24
Martinez	2015	Determine efficacy of multicomponent interventions in preventing incident delirium in the elderly.	7
Rivosecchi	2015	Identify strategies that facilitate the development of a non-pharmacological protocol that could be implemented for critically ill patients	17
Slade	2015	What is the best available evidence regarding occupational therapy for persons with delirium?	31
Sockalingam	2014	Review the evidence for the value of interprofessional delirium education programs on learning outcomes	10
Thomas	2014	In older adult hospitalized non-intensive care unit (ICU) patients, are targeted non-pharmacological, multicomponent interventions effective for preventing and shortening the duration of delirium when compared to usual care?	0
Reston	2013	Assess the effectiveness and safety of in-facility multicomponent delirium prevention programs	19
Yanamadala	2013	Review the literature concerning educational interventions focusing on recognition of delirium	26
Khan	2012	Review evidence-based recommendations for delirium care to practitioners, and identify gaps in delirium research	22
Siddiqi	2007	Determine the efficacy of multicomponent interventions in preventing incident delirium in the elderly	7

Lead Author	Year	Purpose of review	Number of included studies
Milisen	2005	Review the characteristics and efficacy of various multicomponent intervention strategies for delirium in hospitalized older people	3
Fick	2002	Review of medical literature about delirium superimposed on dementia	16
Cole	1996	Determine the effectiveness of interventions to prevent delirium in hospitalized patients	8

HELP involved a skilled interdisciplinary team consisting of a geriatric nurse specialist, two specially trained 'Elder Life' specialists, a geriatrician, and trained volunteers to implement the interventions (Bogardus et al., 2003; Godfrey et al., 2013; Inouye et al., 1999; Rizzo et al., 2001; S. Robinson et al., 2008; Rosenbloom-Brunton et al., 2010). There is much rigorous evidence about the effectiveness of HELP in addressing the intermediate risks for the development of delirium in hospitalized elderly persons (Canadian Coalition for Seniors' Mental Health, 2006; Rathier & Baker, 2011; Siddiqi et al., 2007).

The work of Inouye and associates reoccurred in the systematic reports. This work established a departure point for further examination of multicomponent interventions targeting specific delirium risk factors to significantly reduce the cumulative incidence and duration of delirium. The reorientation, sleep strategies, early mobilization, hearing and vision adaptations, hydration, nutrition, and therapeutic activities areas for intervention have since been further modified and individually examined. HELP, or a version thereof, has been implemented in more than 200 hospitals worldwide (Godfrey et al., 2013; Inouye et al., 2014). This program was developed based on The Yale Delirium Prevention Trial, which was the first clinical trial demonstrating that delirium can be prevented in hospitalized elderly using a multicomponent intervention (Rubin et al., 2006; Watson, Brand, Watson, & LoGiudice, 2009). In addition, during the search for evidence, separate reviews about the efficacy of hydration practices in older adults were scanned.

The number of single studies specific to the phenomenon of delirium prevention in acute care was seven (Table 3). These international studies, published between 2010 and 2014, were most often authored by medical professionals. An advanced care nurse practitioner, Rosenbloom-Brunton, was the lead author of a report addressing the feasibility of a multicomponent intervention program for the family of hospitalized older persons with delirium.

Table 3: *Primary studies addressing non-pharmacological prevention and management of delirium in elderly persons in acute medical units*

Lead author (publication year), location	Discipline/ departmental affiliation of lead author	Aim	Design	Data Collection	
				Delirium risk factors instruments	Delirium
Mattison (2014), Israel	Medicine	Assess the implications of a bundled intervention to detect delirium and promote safer use of medications	Pre/post-test over 24 months	NA	Richmond Agitation and Sedation Scale Items from the Confusion Assessment Method (CAM)
Rudolph (2014), US	Medicine	Assess patient and hospital outcomes of a delirium risk modification toolbox intervention	Comparison	*Cognitive:* Days of the Week Backward; Months of the Year Backward; Clock-in-the-Box *Comorbidity*: Charlson Co-morbidity Index *Dehydration*: blood urea nitrogen to creatinine ratio *Illness severity*: Modified Early Warning Scale *Sensory*: ability to read written instructions or read without access to corrective eyewear	CAM 4-item version

Lead author (publication year), location	Discipline/ departmental affiliation of lead author	Aim	Design	Data Collection	
				Delirium risk factors instruments	Delirium
Holt (2013), United Kingdom	Gerontology	Examine the effectiveness of a multicomponent prevention intervention on incidence of delirium	Pre/post-test over 22 months	*Cognitive*: Mini-Mental Examination Score (MMSE) *Dehydration*: urea / creatinine ratio *Mobility*: independent or needs assessment Number of prescribed medications *Sensory*: Whisper test or use of hearing aide	Delirium Rating Scale Revised – 98 (DRS-R-98)
Zaubler (2013), US	Medicine	Assess the effectiveness and cost impact of a multicomponent delirium intervention program in the hospitalized elderly	Descriptive study over 5 months	NA	CAM Brief cognitive screen including assessment of orientation, short-term recall and the digit span test for presence of delirium Chart-based review for documentation of an acute mental status change consistent with delirium
Akunne (2012), England	Health Economist	Examine the cost benefits of multicomponent interventions in delirium prevention and usual care compared on a medical unit	Comparison	NA	Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) or short-CAM

Lead author (publication year), location	Discipline/ departmental affiliation of lead author	Aim	Design	Data Collection	
				Delirium risk factors instruments	Delirium
Martinez (2012), Chile	Medicine	Examine the efficacy of multicomponent intervention in delirium prevention	Single-blind randomized controlled trial over 10 months	NA	CAM
Rosenbloom-Burton (2010), US	Nursing	Examine the feasibility of family participation in a multicomponent intervention program	Descriptive-exploratory	*Cognitive*: Mini-Mental State Examination *Functioning*: Katz Index of Independence in Activities of Daily Living Sensory Jaeger Test, Whisper test *Co-morbidities:* Chart review for medical history	CAM

The commonly shared purpose of five of the included studies in Table 3 was examination of a bundle of preventive interventions and its associated outcomes. The majority of study designs were experimental. Cognition was the shared variable in all of the three studies measuring risk factors. In hospitals with a range of beds from 80 to 900, the elderly persons were most commonly located in medical units.

A frequently identified risk factor for delirium was cognition as measured by the Mini-Mental Examination Score (MMSE). In 1975, Folstein and associates developed the MMSE as a clinical measure to detect general cognitive impairment in adults and to monitor changes in cognition over time (Faught, 2014; Fayers et al., 2005; Inouye et al., 1990; Levkoff, Liptzin, Cleary, Reilly, & Evans, 1991). The MMSE evaluates orientation, memory, language, construction, arithmetical calculation, reasoning and executive functioning with a 20-item interactive questionnaire that can be completed in approximately five to ten minutes (Fayers et al., 2005; Folstein, Folstein, & McHugh, 1975). The MMSE is scored on a scale from 0 (poor) to 30 (excellent), with a score of less than 24 indicating a cognitive impairment (Cole et al., 2002; National Institute for Health and Clinical Excellence (NICE), 2010; Rosenbloom-Brunton et al., 2010). Reliability and validity is well established in psychiatric, neurologic, geriatric, and other medical presentations (Faught, 2014; Mitchell, Shukla, Ajumal, Stubbs, & Tahir, 2014). The benefits of the MMSE as a clinical screening instrument include limited training for administration, a provision of baseline cognitive information, and its receptivity by study participants (Rapp et al., 2000; Smith, Breitbart, & Platt, 1995). On the other hand, its reported limitations include: bias towards false-negatives, lack of items specific for delirium, the influence of psychosocial issues on scoring, and finally, lower completion rates by acutely ill

patients (Fayers et al., 2005; Levkoff et al., 1991; McCurren & Cronin, 2003; Sendelbach et al., 2009; Smith et al., 1995).

The most common instrument used to assess for the presence of delirium across the seven studies was the Confusion Assessment Method (CAM). It was developed by Inouye et al. (1990) based on a literature review and expert consensus by the Hartford Institute for Geriatric Nursing. It was designed to be a simple diagnostic algorithm for delirium used to screen for delirium in elderly admitted to acute medical units who were at high risk of developing delirium (Faught, 2014; Inouye et al., 1990; McCusker et al., 2011; Wei, Fearing, Sternberg, & Inouye, 2008). The CAM utilizes nine operational criteria for delirium as outlined by the DSM-III including acute onset and fluctuation of symptoms over the course of the day, inattention, disorganized thinking, altered level of consciousness, disorientation, memory impairment, perceptual disturbances, psychomotor agitation or retardation, and altered sleep-wake cycle. Further, the CAM was developed to be used in conjunction with clinical observations and the MMSE to determine the individual's cognitive status (Inouye et al., 1990; Sendelbach et al., 2009; Vreeswijk, Timmers, de Jonghe, & Kalisvaart, 2009). If a formal cognitive assessment is not completed when conducting the CAM, its sensitivity is compromised (Wei et al., 2008). The CAM is also recommended in the reviewed guidelines and an aspect of the systematic reviews presented in Tables 1 and 2.

The CAM's sensitivity ranges between 94 and100% and has a specificity between 90 and 95% when compared against the ratings of gero-psychiatrists (Holt et al., 2013; Khan et al., 2012; National Institute for Health and Clinical Excellence (NICE), 2010; Rathier & Baker, 2011; Zaubler et al., 2013). It has also been found to have a high interrater reliability ranging from 0.81 to 1.00 (Trzepacz, 1994; Wei et al., 2008). Due to its consistently strong psychometric

properties, the CAM has become characterized as the ‘gold standard’ for the assessment of confusion and/or cognitive status in those with delirium.

In Table 4, the hospitals’ sample, the non-pharmacological multicomponent approach, and the outcomes are presented. The samples of older adults and family caregivers ranged from 15 to 10,053 individuals. The lowest age of the older adult was 70 years. The mean age of the sample of family caregivers was 61.1 years (Rosenbloom-Brunton et al., 2010). The delivery of varied components of the interventions involved a multi-disciplinary team with the exception of the study by Rudolph et al. (2014). In this study, nurses implemented delirium screening, a delirium toolkit, and education to various health care providers and families. In another study by Martinez et al. (2012), family members received education and then provided delirium prevention interventions.

Across the seven studies the foci of the diverse multicomponent practices were delirium screening, delirium prevention, assessment for delirium, and delirium education for health care providers and families (Table 4). The number of components to their multicomponent interventions per study ranged from four to eight (Table 5). Orientation and sensory (vision-hearing) were the most frequent components assessed. Overall, such practices yielded positive patient (improved safety), family (use of orientation strategies), and service (decreased costs) outcomes. The multicomponent interventions allowed for an improved detection of delirium. Reduction in delirium duration (Zaubler et al., 2013) and delirium incidence was a primary outcome (Holt et al., 2013) in some of the seven studies.

Table 4: *The sample, intervetion and findings of the primary studies addressing non-pharmacological prevention of delirium in elderly persons in acute medical units*

Lead author (publication year)	Patient	Provider	Intervention	Summary findings [95% Confidence Interval]
Mattison (2014)	n = 4,482, 70 – 79 years post-intervention n = 5,571 ≥ 80 years post-intervention	Group of geriatricians, hospitalists, and nurses	**Assessment/Monitor** 1. 24 hour bedside checklist form (vitals, input/output, blood glucose) 2. A twice-daily delirium screening 3. A daily test of attention and an enhanced computerized provider order entry (CPOE) interface system with decision support **Prevention** Daily tether review Mobilizing patient twice daily Minimize daytime napping Decrease aspiration risks Minimize risk for falls Medication review Encourage daily activities **Education** Interdisciplinary and residents	Significantly more patients receiving the intervention were discharged home (OR = 1.18 (1.04 to 1.35 $p = 0.01$) Bundled interventions had no observed effect on length of hospitalization, in-hospital mortality, triggers for marked nursing concerns and overall number of triggers
Rudolph (2014)	N = 1527, mean age 78.3 years	Nurses	**Screening** Cognitive performance, sensory impairment, and dehydration **Implementation of Delirium Toolbox** To correct sensory input, stimulate cognition, and promote sleep **Education** Patients, family, and staff	Toolkit interventions were associated with shorter lengths of stay (OR = -0.7 (-1.37 to -0.1)) and lower rates of restraint use (OR -4.0 (6.7 to -1.2)) Greater number of interventions associated with increasing delirium risk (r = 0.24, $p < .001$)

Lead author (publication year)	Patient	Provider	Intervention	Summary findings [95% Confidence Interval]
Holt (2013)	n = 210 in the 'before' group; mean age 85.01 years n = 152 in the 'after' group; mean age 85.8 years	Specialist nurse, consultant geriatrician, nurse manager, healthcare assistants, and staff nurses	**Screening** Delirium risk factor modification documentation three times per day and delirium assessment protocol **Education** To raise awareness	82% of providers who completed education had increased delirium knowledge Adherence to risk factors was moderate (27% to 57%). Adherence was highest for cognitive reorientation and hydration and lowest for mobility and constipation Delirium incidence was significantly reduced from 13.3% in the before group to 4.6% in the after group (OR = 3.54 (1.31 to 9.56))
Zaubler (2013)	n = 215 in the before group, mean age 82.2 years n = 380 in the after group, mean age 83.2 years	Trained HELP volunteers and Elder Life Specialists	**Adapted HELP** Daily visits Therapeutic activities Feeding assistance Hydration Sensory aides Sleep assistance	There was a significant reduction in the episodes of delirium (40%) There was a significant reduction in patient days by 6 days The duration of delirium significantly decreased by ½ day Overall length of hospitalization decreased by 2 days and cost savings
Akunne (2012)	N = 852 patients $\geq$ 79 years old admitted from urgent to a general medicine service	Enhanced care systems	**Mediate risk factors** Cognitive impairment Sleep deprivation Immobility Sensory impairments Dehydration	Intervention significantly associated with cost savings relative to quality of life gains (new dementia, falls, pressure ulcers and new admission to LTC)
Martinez (2012)	N = 287 patients, mean age 78.2 years	Family members	**Education** With family members Cognitive orientation and reorientation Avoidance of sensory deprivation Presence of familiar objects Extended visitation	Reduction in incidence of delirium RR = 0.41 (0.91 to 0.92 p = 0.027)

Lead author (publication year)	Patient	Provider	Intervention	Summary findings [95% Confidence Interval]
Rosenbloom-Burton (2010)	N = 15 family caregivers, mean age 61.2 years	Nurse supported family-HELP program involving trained family caregivers	**Family delirium prevention** Orientation Cognitive stimulation Sensory protocol Functioning	Intervention completion occurred at least 55% of the time The highest implemented protocols were orientation and cognitive stimulation Nurses working in therapeutic alliance with patients and families promoted families involvement in prevention

Table 5: *The components of the non-pharmacological multicomponent interventions in elderly persons in acute medical units*

Interventions	Lead author & date						
	Mattison (2014)	Rudolph (2014)	Holt (2013)	Zaubler (2013)	Aklinne (2012)	Martinez (2012)	Rosenbloom-Brunton (2010)
Mobilization			X		X		X
Elimination	X		X				
Orientation		X	X	X	X	X	X
Vision		X	X	X	X	X	X
Hearing		X	X	X	X	X	X
Hydration			X		X		
Nutrition				X			
Pain			X	X			
Sleep		X		X			
Environmental factors	X				X	X	
Staff education			X				
Family involvement	X					X	X
Medication review	X			X			
Geriatric assessment	X			X			
Assess for depression							
Therapeutic activities				X			X
Reducing immobilizing devices							
Noise reduction				X			
Reorganizing care				X			

Chapter 3

Methodology and Methods

This chapter presents a meta-synthesis approach. Given the diversity and volume of reports addressing non-pharmacological, multicomponent delirium interventions in acute care settings, the researcher decided to apply a summative approach to understand the nature of such practices in LTC. This chapter begins with an overview of one methodology appropriate for the synthesis of a body of knowledge regarding delirium in older adults residing in LTC. Each step of the process is described including: identification of the search question, systematic search for reports, selection of relevant reports, and extraction of information from each individual report. This chapter concludes with techniques used for data analysis.

Methodology

Meta-synthesis provides academics and researchers with an opportunity to examine evidence generated through diverse approaches. Sandelowski, Voils, and Barroso (2007) suggested that synthesis methodologies are particularly sensitive to new knowledge generation methods that have been used to examine complex and novel research topics. Meta-syntheses serve as a resource for representing a body of evidence, unconstrained by methodological and topical differences within the original work. Given that health care providers are faced with a plethora of heterogeneous evidence, reviews have become meritorious in the synthesis of literature to advance evidence-informed nursing decision-making and practice. Grant and Booth (2009) have identified 14 discrete types of reviews. Despite the unique distinctions within this grouping of types of reviews, each involves accessing, inspecting and examining evidence. One of the types is a scoping review, a relatively new contribution to the academic literature.

In 2003, Arskey, from a social policy background, authored one of the first scoping reviews. The aim of this study was to explore services used by carers of persons with mental health problems. Since then, there have been over 600 scoping reviews published in Web of Knowledge, an interdisciplinary data source. In August 2015, in the Cumulative Index to Nursing and Allied Health Literature, there were 202 citations with the phrase "scoping review" in the title. The aim of the first scoping study published in a nursing journal was to collate the psychosocial interventions delivered by family carers of persons with Parkinson's disease (Hempel, Norman, Golder, Aguiar-Ibanez, & Eastwood, 2008). These authors reported that although the majority of the included 30 reports described unique and multicomponent interventions, there was limited evidence specific to their implications for the carers. More recently, Sawka and colleagues (2010) sought to provide diverse groups of stakeholders with a comprehensive resource to summarize hip fracture prevention practices for older adults in LTC. In addition, the use of a scoping review yielded information specific to gaps in knowledge and highlighted the foci for future research.

Despite the recent prevalence in the use of this methodology to synthesize research evidence, there is no universally accepted definition for scoping review (Arksey & O'Malley, 2005; Davis, Drey, & Gould, 2009; Levac, Coquhoun, & O'Brien, 2010). Pham and associates (2014) conducted a scoping review of scoping reviews. They reported that nearly 65% of the reviewed studies included a definition of scoping review. Most commonly however, these definitions emphasized the systematic and replicable process essential for the identification, characterization, and representation of literature specific to a phenomenon of inquiry. The focus of a scoping review is the synthesis of literature, generated through potentially diverse theoretical and methodological orientations, with the intent of representing a broad topic of knowledge

(Grant & Booth, 2009; Rumrill, Fitzgerald, & Merchant, 2010; Weeks & Strudsholm, 2008). In contrast, the purpose of a systematic review is the critical appraisal and evaluation of evidence in response to a circumscribed question of inquiry (DiCenso, Guyatt, & Ciliska, 2005). Scoping reviews have been critiqued relative to the attribute of rigor inherent in more traditional approaches. Yet authors across the typology of meta-syntheses articulate the shared features of transparency, comprehensive, and systematic analysis of published evidence to represent the state of the knowledge.

Researchers undertake scoping reviews to lead to a new or deeper understanding of a phenomenon through (i) examination and aggregation of the extent, range, and nature of research activities; and, (ii) dissemination of research findings and identification of knowledge gaps (S. Anderson, Allen, Peckham, & Goodwin, 2008; Arksey & O'Malley, 2005; Brien, Lorenzetti, Lewis, Kennedy, & Ghali, 2010; Levac et al., 2010; O'Brien, Wilkins, Zack, & Solomon, 2010). These activities are a precursor to the development of theoretical and empirical clarity which ultimately serves as a guide for policy, practice, education, and research decision makers (Arksey & O'Malley, 2005; Davis et al., 2009; Levac et al., 2010). Undertaking such an extensive review of available literature, often heterogeneous in nature, is a multi-staged time intensive initiative.

The exploratory nature of a scoping review, involving literature, conceptual, or policy mapping, as described by Anderson et al. (2008) is conducive to determining whether a full systematic review is warranted. Literature mapping, the most prevalent type of scoping review, is undertaken to present a preliminary account of the 'who,' 'what', 'when,' 'where,' 'why,' and 'how' of the published literature. Identifying the phenomenon's chorological and context development is of great challenge given the potential diversity of the literature. Conceptual mapping primarily focuses on the terminology used to depict a phenomenon. Finally, policy

mapping focuses exclusively on the collection and review of professional and governmental documents. For the purpose of this scoping review, literature mapping was a preliminary aspect in the synthesis of evidence regarding the prevention and management of delirium for the older adult residing in LTC. Although time intensive, a rigorous and transparent process is necessary to map the volume, nature, and characteristics of the targeted body of evidence.

Methods

Design

In this study, Arksey and O'Malley's (2005) original framework for scoping reviews was used to aggregate the evidence pertaining to the prevention of delirium for the older adult residing in LTC. Implementation of this design was further guided by the methodological refinement and clarity offered by Levac, Coquhoun, and O'Brien (2010). Both articles detail the importance of drawing conclusions based on the systematic and transparent summarization of a breadth of literature without assessing the quality of the evidence. This framework includes six iterative stages, the final of which is an optional consultative stage. For the purpose of this study, the five mandatory stages were conducted and are described below.

Stage 1: Identifying the research question

The aim of this initial stage is the formulation of a clear research question which serves to guide the researcher through the entire scoping review process. A scoping review research question reveals those parameters of particular relevance to the review such as the topic/concept of interest, the target population, and interventions or outcomes (Arksey & O'Malley, 2005; Levac et al., 2010). The initial question included these three aspects: delirium, older adults, and of particular foci, its prevention. These broad parameters were deemed ineffectual in revealing the context-specific knowledge that would guide practice in my area of specialty, LTC. It

became apparent during early searches of the literature that a plethora of citations addressed older adults with multiple health challenges across diverse health care settings. This early insight into the breadth of the literature peripheral to the core intent of the study resulted in the articulation of further parameters of the scoping review. During this stage, Arksey and O'Malley (2005) acknowledged that it is within the purview of the researcher to make revisions to the breadth of the search if an unmanageable volume of literature is revealed early in the process (Arksey & O'Malley, 2005). The finalized research question for this study was 'what is the nature of evidence pertaining to non-pharmacological nursing interventions for the prevention of delirium among elderly residents in the LTC setting?'

Stage 2: Identifying relevant studies

This stage involves the development of a search plan to identify literature that has the potential to address the research question. Barroso et al. (2003) cautioned that a potential threat to the integrity of any review is the failure to complete a sufficiently exhaustive search. Retrieval of all relevant literature can become an unmanageable undertaking that warrants strategic planning to maintain the focus of the researcher. Arksey and O'Malley (2005) identified the key components of the plan as the identification of different literature sources such as electronic databases, reference lists, hand-searching of key journals, and existing networks, relevant organizations, and conferences. In an effort to achieve a comprehensive review, alternate scoping review information sources have included grey literature, websites, and Uniform Resource Locators (Arksey & O'Malley, 2005; Asano, Berg, Johnson, Turpin, & Finlayson, 2015; Brien et al., 2010; Levac et al., 2010; Rumrill et al., 2010).

In consultation with an academic librarian, search strategies utilized in this study included a variety of electronic databases to identify relevant evidence (Table 6). Following

initial identification of literature, reference lists were searched for additional studies that had the potential to explicate the practices of delirium prevention and management. At this time, the works of several key authors were commonly cited within the identified body of evidence. Further, hand searches of key journals and books were completed. In addition, the websites for a selection of international, national, and provincial organizations were searched for relevant documents. These sites included: National Institute for Health and Care Excellence; Scottish Intercollegiate Guidelines Network; Ministry of Health and Long Term Care; Canadian Gerontological Nurses' Association; and, Registered Nurses' Association of Ontario.

Table 6: *Electronic databases searched*

Resource	Database
Pre-processed databases	Campbell Collaboration Cochrane Library Evidence-Based Nursing Joanna Briggs Institute
Unprocessed databases	CINAHL/OVID EMBASE MEDLINE PsycINFO
Clinical Practice Guidelines	National Guideline Clearinghouse database RNAO Best Practice Guideline National Institute for Health and Care Excellence SIGN
Other evidence-bases sources	Ministry of Health and Long Term Care

Rumrill, Fitzgerald, and Merchant (2010) recommended that the search plan should include specific search terms or descriptors. With each search, there was a record of the search terms and the results relative to data source. A sample record, conducted on August 26, 2015, is presented in Table 7. Additional records are found in Appendix A. As suggested by Barroso et al. (2003) it may be necessary to use several related search terms in variable combinations in order to identify potentially relevant studies, as databases do not necessarily share common terminology. Further, it was recommended that clarity regarding search limitations such as publication dates be identified (Rumrill et al., 2010). When defining the breadth of the review,

through the introduction of search restrictions, the researcher must justify their decisions (Levac et al., 2010). No time limits were placed on the publication dates for this review given the initial number of citations generated using the identified search terms. Only those citations published in English were included in the search in order to ensure comprehension of the work by the researcher.

Table 7: *August 26, 2015 record of search for evidence published between September 8, 2014 and August 25, 2015*

Search Terms	CINAHL	OVID	Proquest	Evidence Based Medicine Review: EBMZ/ Cochrane	Medline	PubMed	Psyc INFO	Joanna Brigg's Institute EBP Database
Deliri*; long term care; interven*	5	25	52	5	2	22	2	5
Deliri*; long term care facili*; interven*	0	8	25	0	0	1	0	1
Deliri*; nursing home; interven*	5	26	31	5	0	10	5	5
Deliri*; interven*; post acute	1	4	34	3	0	8	1	3
Deliri*; multi component interven*	0	2	5	1	1	0	0	2
Deliri*; multicomponent interven*	5	10	13	0	1	5	0	4
Acute confusion*; long term care; interven*	0	1	5	0	0	7	1	0
Acute confusion*; long term care facili*; interven*	0	0	2	0	0	1	0	0
Acute confusion*; nursing home; interven*	0	5	3	1	0	2	0	1
Acute confusion*; multi component interven*	0	0	0	1	0	0	0	1
Acute confusion*; multicomponent interven*	0	2	1	0	0	0	0	1
Manag*; deliri*; post acute	0	3	46	3	0	7	0	3
Treat*; deliri*; post acute	1	3	1	2	0	10	2	2
Manag*; deliri*; nursing home	3	29	1	4	0	12	3	6
Manag*; deliri*; long term care	3	11	3	4	0	11	3	4
Manag*; deliri*; care home	3	0	2	1	0	17	3	1
Treat*; deliri*; long term care	7	10	4	4	0	13	7	4
Treat*; deliri*; nursing home	6	26	2	4	0	13	6	5
Treat*; deliri*; care home	3	0	4	1	0	27	8	1
Interven*; deliri*; (nursing home* or long term care or care home*)	8	23	6	-	0	29	7	-
Manag*; deliri*; (nursing home* or long term care or care home*)	5	29	3	-	0	28	7	-
Treat*; deliri*; (nursing home* or long term care or care home*)	10	26	7	-	0	45		-
Deliri*	357	364	242	194	588	898	-	51

* = Abbreviated term - = Terms not entered in database

Over the course of 26 months, a total of nine academic electronic databases were searched and over 700 articles were identified. Once duplicate studies were removed, a total of 13 documents meeting the studies inclusion criteria were identified. As suggested by Barroso et al. (2003), a data management tool can be used to record and organize all citations. The citation database specifically used in this study was RefWorks®.

Stage 3: Study selection

This stage involves refinement of inclusion and exclusion criteria to generate a final list of literature that will be included in the scoping review (Levac et al., 2010; Rumrill et al., 2010). For this study, inclusion and exclusion criteria are outlined in Table 8. These criteria were applied to determine relevance to the research question. To confirm screening of studies relative to the inclusion and exclusion criteria, reading titles, abstracts, and if necessary, a rapid review of an individual study, determined its eligibility for inclusion. Levac et al. (2010) recommended that multiple independent reviews of full text articles are necessary to determine inclusion if ambiguity exists. In this study, two of the thesis committee members independently reviewed studies, when study inclusion, based on established criteria, was ambiguous.

Table 8: *Study selection criteria*

Inclusion criteria	Exclusion criteria
Older Adult (≥ 60 years of age) Residential LTC Delirium or acute confusion Aligns with nursing practice Primary research studies or systematic reviews Individual or grouped interventions for delirium Prevention and/or management	Diagnostic exclusions: subsyndromal delirium, delirium tremens Palliative/End of life population Focus exclusively on pharmacological interventions Full text unavailable Residents in short-stay services Combined samples of LTC and acute care populations

Stage 4: Charting the data

The product of this stage is a tabulated account of extracted content to describe salient information from each individual study (Arksey & O'Malley, 2005; Grant & Booth, 2009; Levac et al., 2010). Table 9 represents the extracted data relative to the following variables: lead author

and disciplinary affiliation, year of publication, study location, study aim(s), design, setting, and sample. This table demonstrates the initial organization of data generated through similar and dissimilar approaches. Representation of these core elements is common in scoping reviews (Davis et al., 2009; Pham et al., 2014). The extracted evidence from the included systematic review (n = 1) and primary studies (n = 10) establishes the foundation for stage five in this scoping review. The evidence in Table 9 is presented in chronological order to prevent premature synthesis processes. Extracted data was verified with one member of the thesis committee. Further information pertaining to the individual studies, including the study's approach, intervention(s) examined, and the findings relative to the intervention(s), is presented in Chapter 4 Table 13.

Table 9: *Individual studies of non-pharmacological prevention and management of delirium in persons residing in LTC*

Lead author (publication year), location	Discipline/ departmental affiliation of lead author	Aim	Design	Setting	Sample	Sample characteristics
Voyer (2014), Canada	Nursing	Develop, implement and evaluate feasibility of a delirium prevention program for cognitively impaired residents	Participatory action	Two LTC facilities in Quebec City and one in Montreal	N = 38 staff (nurses, nursing assistants, and orderlies) N = 141 residents	Mean age of nurses across the three cycles was 47.1 years with 15.9 years experience in geriatrics Majority of residents were female, 80 years of age or older with co-morbid conditions with length of stays of two or more years
McCusker (2013), Canada	Epidemiology, Biostatistics, and Occupational Health	Identify ten modifiable environmental and medication risk factors associated with delirium	Prospective, observational cohort	Seven LTC facilities in Montreal and Quebec	N = 272 residents	Majority of residents were female, 80 or older with length of stays of one or more years Over 60% had dementia, MMSE score for 74% of them was between 10-30 Nearly 75% had 2 or more co-morbid conditions
Voyer (2012), Canada	Nursing	Evaluate LTC nurses ability to detect delirium	Prospective, observational cohort	Seven LTC facilities in Montreal and Quebec	N = 202 residents	Mean age 84.6 years; 56.4% females; 60% had a diagnosis of dementia

Lead author (publication year), location	Discipline/ departmental affiliation of lead author	Aim	Design	Setting	Sample	Sample characteristics
Siddiqi (2011), UK	Medicine	Assess the feasibility of a delirium prevention program, Stop Delirium!, in LTC	Mixed methods	Nine units from six care homes over 10 months	N = 286 residents N = 216 staff	Older age; significant levels of co-morbidities; greater than 50% had a diagnosis of dementia and 33% receiving anti-depressants; 10.6% of residents had an episode of delirium documented in the past month 76% of staff did not have nursing training and 32% turnover of staff in 10 months
Siddiqi (2008), UK	Medicine	Design a multicomponent intervention and to identify factors that promote or hinder its implementation in practice	Descriptive	Six care homes (residential, nursing, and dementia units) for older persons in the UK over 10 months	N = 191 staff attended at least one delirium training session	Not provided
Voyer (2008), Canada	Nursing	To determine detection rates of delirium and delirium symptoms by LTC nurses	Prospective clinical	Three LTC facilities and one LTC unit in a regional hospital in Quebec	N = 156 residents N = 40 bedside nurses	Mean age 86.3 years; majority female; length of stay mean 2.6 years; degree of cognitive impairment >95%; 41% comorbidity; mean number of prescription medications 9.1 100% female; mean age 47.3 years; 56.4 had college preparation; mean experience 21.2 years

Lead author (publication year), location	Discipline/ departmental affiliation of lead author	Aim	Design	Setting	Sample	Sample characteristics
Culp (2003), US	Nursing	Evaluate the impact of a weight-based hydration management intervention on incidence of acute confusion	Quasi-experimental	Seven LTC facilities in eastern Iowa	N = 98	Mean age 84.5 years; majority female; mean MMSE score 23.5
Mentes (2003), US	Nursing	Evaluate effectiveness of a hydration intervention on incidence of acute confusion, infections, and falls	Quasi-experimental	Four LTC facilities in eastern Iowa	N = 49	Mean age 80.6 years; majority female; mean length of stay 23 months; mean number of diagnoses 6; mean MMSE score 22
Robinson (2002), US	Nursing	Determine effectiveness of a hydration program	Comparison	A 250-bed nursing home in a small mid-western city	N = 51	Mean age 83.5 years; majority female; mean number of diagnoses 7.4
Culp (1997), US	Nursing	Describe the incidence of delirium, its antecedent conditions, and the recognition rate of LTC nursing staff	Longitudinal	Two large Veteran Affairs LTC facilities	N = 37	53% of sample 75 years of age or older

In addition to the two best practice guidelines addressed earlier in Chapter 2, a total of 10 primary research articles and one systematic review were obtained meeting the research question and the inclusion criteria. Specific to the primary studies, year of publication ranged from 1997 to 2014, with the majority of the articles being published in 2003 (n = 3, 30%). The majority of the research was shared equally by American and Canadian authors (n = 4, 40%) and belonging to the nursing profession (n = 7, 70%). Another country in which research originated was the United Kingdom (n = 2, 20%). Professions who also contributed to the research findings include medicine (n = 2, 20%), and epidemiology and community health (n = 1, 10%). A variety of methodologies were used to capture the nature of the evidence, including prospective observational cohort (n = 2, 20%), quasi-experimental (n = 2, 20%), comparison (n = 1, 10%), descriptive (n = 1, 10%), longitudinal (n = 1, 10%), mixed methods (n = 1, 10%), participatory action (n = 1, 10%), prospective clinical (n = 1, 10%), and systematic review (n = 1, 10%).

Stage 5: Collating, summarizing, and reporting the results

Stage five is the most extensive, time consuming and critical component in a scoping review as it requires the researcher to analyze the data, translate the charted themes, trends, and gaps into narrative descriptions and report the findings to broad audiences (Levac et al., 2010; Rumrill et al., 2010; Sandelowski, Leeman, Knafl, & Crandell, 2013). As described and suggested by Sandelowski et al. (2013), anchoring of findings strategies should be considered and used flexibly to anchor text to context with finding statements including the following: sample information, source of information, information about time, comparative reference points, magnitude and significance, and study-specific conceptions of phenomena. These anchoring strategies can be found in the results chapter in the tabulated findings charts. Based on the findings charts, thematic summaries of the data are illustrated which in turn provide a

description or explanation of the target findings allowing reviewers a better way to see ways to link them (Thorne, Jenson, Kearney, Noblit, & Sandelowski, 2004). A numerical analysis of the extent and nature of the included studies can be included using tables and charts (Levac et al., 2010). Arksey and O'Malley (2005) described in their scoping review framework the need to provide a descriptive numerical summary, as well as describe the characteristics of included studies, including the overall number studies included, types of study design, years of publication, types of interventions, characteristics of the study populations, and countries where studies were conducted (Levac et al., 2010). Researchers need to use caution as scoping reviews do not seek to 'synthesize' evidence, aggregate findings from different studies, present the 'weight' of evidence, or determine the generalizability or robustness of studies (Arksey & O'Malley, 2005). When completing this section, authors should consider the meaning of their scoping review results and the implications it will have on research, policy, and practice (Levac et al., 2010).

A review of the literature is the general starting point of any research study as it is when the researcher determines their topic of interest, how the topic has been previously studied and utilized in the research, and is also a strategy to convince the reader that additional studies are justifiable to further advance our knowledge base and applicability to clinical practice (Thorne et al., 2004). Furthermore, an inventory, description, comparison, and/or a critique of the findings should occur (Thorne et al., 2004). Systematic literature reviews, including scoping reviews, accomplish the above by providing a systematic overview of the present status of our understanding of a topic, provide valid provisional conclusions about the clinical problem, and upon its completion, it serves to identify any gaps of knowledge, guide further studies, and easily allows practitioners to apply relevant findings to their personal practice (Nannini & Houde,

2010; Sandelowski, 2008). The findings of this scoping review are presented in the results chapter and further dialogue regarding the findings results and clinical implications are presented in the discussion chapter.

Stage 6: Consultation exercise

The last stage of the scoping review methodology involves consultation with key stakeholders to offer additional sources of information, ensure comprehensive inclusion of all relevant materials, perspectives, meaning, applicability, and validation of the scoping study (Arksey & O'Malley, 2005; Brien et al., 2010; Levac et al., 2010). This optional stage can greatly enhance some pieces of work as the practitioners and consumers contribute directly to the work (Arksey & O'Malley, 2005). This stage was not planned for inclusion in this research. The consultation stage is planned to occur, however, following thesis defence.

Chapter 4

Results

In this chapter, information is presented pertaining to non-pharmacological prevention of delirium among elderly residents in LTC settings, as reported in the 13 selected reports, including the two best practice guidelines specific to older adults in LTC outlined in Chapter 2. The findings in this chapter represent a narrative summary of the nature of the interventions described within the reports. In order to build knowledge for practice, research consumers are guided to consider multiple types of research evidence. The evidence included in this review is presented in accordance with Brown's (2009) hierarchy (Figure 1). Sequentially the results of this scoping review are presented as follows: two best practice guidelines, one systematic review, and ten primary studies. At the conclusion of the chapter, the nature of the non-pharmacological prevention inventions in the scoped evidence is aggregated to provide a summative description.

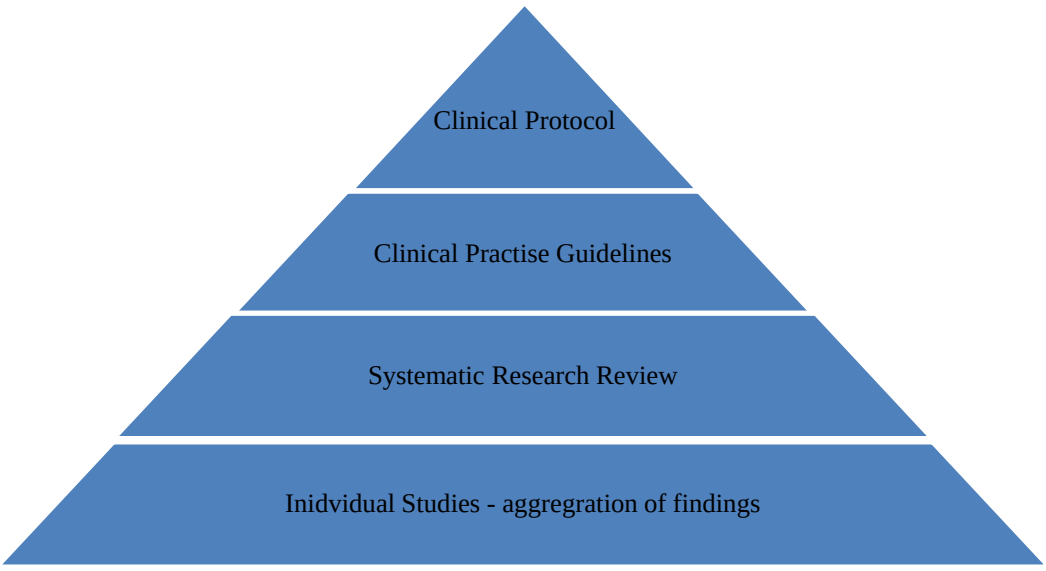

Figure 1: *Modification of Brown's (2009) building knowledge for practice*

Two best practice guidelines were selected to address the purpose of this study (Table 10). Both documents, published in 2010, represent a summary of international evidence to inform the care of older adults with or at risk for delirium. A clinical guideline, commissioned by the National Institute for Health and Clinical Excellence, aggregated delirium evidence in response to 20 clinical questions addressing delirium diagnosis, prognosis, interventions, treatment in a hospital setting, treatment in a LTC setting, patient information, and prevalence relative to different settings. The guideline included a core message that was labeled *Think Delirium.* The message was represented through two discrete pathways: prevention and diagnosis; and, treatment. The pathway components relevant to prevention and diagnosis included the following four elements: risk factor assessment; indicators of delirium at presentation; interventions to prevent delirium; and specialist clinical assessment. The non-pharmacological component of the separate treatment pathway was specific to initial management. Both pathways were deemed applicable to older adults whether they present in a hospital or LTC setting. Although developed predominantly from research conducted in acute care settings, two single studies conducted in LTC settings which reported the effect of hydration interventions on delirium prevention were identified.

The Canadian guideline, authored by the Registered Nurses' Association of Ontario (2010a), builds upon their earlier work published in 2004. The updated resource was developed to integrate contemporary evidence-based information as an approach to making recommendations regarding the best care strategies to address delirium, dementia and/or depression among older adults. The identified audience are nurses (Registered Nurses (RNs) and Registered Practical Nurses (RPNs)) responsible for the provision of care to individuals within acute, long-term, and community care settings. This document included six practice

recommendations that uniquely addressed delirium. These included: i) awareness of the importance of delirium recognition and urgent treatment for positive outcomes; ii) use of diagnostic criteria within the revised Diagnostic and Statistical Manual (DSM) IV to guide delirium assessment and documentation; iii) initiate use of standardized screening protocols; iv) enact delirium prevention through awareness of a person's individual risk factors; v) select and implement multicomponent care strategies (consult specialized services; establish physiological stability; manage the environment; promote current knowledge for self and others; ensure effective and supportive communication; implement behavioural interventions) to address an individual's predisposing risk factors; and vi) continually monitor, evaluate, and modify the multicomponent care strategies. The practice recommendations however, were predominantly supported by evidence generated based on single studies of hospitalized older adults. In the discussions of evidence, the authors proposed that evidence-informed acute-care practices may be applicable to older adults residing in LTC facilities. The guideline also identified nursing actions that were generic for delirium, dementia and depression. These included: use of the Resident Assessment Instrument and the Minimum Data Set instruments to support the assessment of delirium, dementia and depression; and avoid the use of physical and chemical restraints as first line strategies for older adults with delirium, dementia, and depression.

In addition to offering overall recommendations for preventing and managing delirium, the authors of both guidelines provided supplementary details that have the potential to guide clinicians in their care practices. Overall, the nature of the supplementary information supports a multicomponent approach to delirium prevention and management. Each document presented similar interventions and foci for consideration by the clinician. A common intervention was early and ongoing assessments of the individual for modifiable person-centered risk factors and

indicators of delirium including: fluctuating alterations in cognition, comfort, behaviour, sleep, vision, hearing, nutrition, hydration, oxygenation, elimination, fluid/electrolyte balance, mobility, infectious processes, and medication management. Non-modifiable person-centered risk factors warranting assessment included risk for or presence of co-morbidities such as heart disease, kidney disease, and dementia. In addition, the clinician is guided to assess environmental risk factors including level and timing of sensory stimulation such as lighting, sound, treatment interventions, and visitations with family. A second grouping of interventions was action-oriented strategies directly based on the assessment of the elderly individual's internal and external environments. These included both independent nursing actions and involvement of specialty services. Often, the interventions listed were not discrete for prevention or management. The implementation of interventions was predicated on foundational knowledge of delirium, therapeutic presence, and ongoing evaluation relative to a goal-achievement, specifically delirium prevention and management.

Table 10: *Nursing best practice guideline of non- pharmacological prevention and management of delirium in persons residing in LTC (n=2)*

Lead Author (publication year), location	Recommended interventions for delirium prevention and management	Supplementary details to guide practice	Goal
National Institute for Health and Care Excellence (2010), United Kingdom	Think Delirium Early assessment for risk factors (advancing age; cognitive impairment; hip fracture; severe illness) Indicators of delirium for those identified as at-risk (change in cognition; perception; physical functioning; social behaviour) Interventions to prevent delirium (trained, competent interdisciplinary team members familiar with the person; tailored multicomponent intervention package; address impairment) Daily observations for changes or fluctuations in recent behaviour Diagnosis through specialist clinical assessment (use of Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) standard or Confusion Assessment Method (short CAM) to confirm diagnosis; document diagnosis) Treatment of delirium: initial management (identify and address underlying causes of delirium; orient to reality; consider involvement of family and friends); attend to people in distress (appropriate de-escalation techniques)	Attend to: Cognitive impairment or disorientation: appropriate lighting and signage; convenient positioning of clock and calendar; regular visits with family and friends; cognitively stimulating activities Dehydration and constipation: adequate fluid intake; individualize particular to co-morbidities (heart failure, kidney disease) Hypoxia: optimize oxygen saturation Altered mobility: mobilization with aids as necessary; range-of-motion Infection: manage infection; avoid unnecessary catheterization; implement infection control procedures Multiple medications: regular review of medications Pain: assess and manage pain management if pain is suspected Altered nutrition: nutrition support guidelines; oral hygiene Sensory function: ensure accommodation for hearing and visual deficits; manage ear wax	Provide foundational knowledge for the diagnosis, prevention, and management of delirium in adults, inclusive of older residents living in long term residential care or a nursing home

Lead Author (publication year), location	Recommended interventions for delirium prevention and management	Supplementary details to guide practice	Goal
	Informational and support to elderly, family and care providers	Sleep disturbance: avoid clinical procedures during rest periods; control environmental stimuli during rest periods Knowledge development: offer information to at-risk individuals, their family and carers; ensure information aligns with cultural, cognitive, and language needs of the person	
Registered Nurses' Association of Ontario (2010), Canada	Nurses should: Anticipate the possibility of delirium through an awareness of the importance of early recognition and urgent treatment to support positive outcomes Use the revised Diagnostic and Statistical Manual (DSM) – IV diagnostic criteria to assess and document delirium Initiate use of standardized screening protocols such as the Confusion Assessment Method (CAM) to identify risk factors for delirium Implement prevention efforts tailored to a person's individual risk factors Target causes of delirium through selection and implement of multicomponent care strategies in collaboration with other disciplines Continually monitor, evaluate, and modify the multicomponent care strategies to address fluctuations in symptoms	Become familiar with use and interpretation of standardized assessment tools to screen for the potential presence of delirium Address risk factors: presence of cognitive impairment; acute illness and chronic co-morbidities; infections (urinary tract infection, pneumonia, encephalitis); auditory and visual impairments; medications; electrolyte balance and hydration; altered mobility; sleep disturbances Attend to individual's predisposing risk factors through multicomponent care strategies: appropriate consultation and referral to specialized services; promptness; geriatric and psychiatric services; neurologists; multidisciplinary team Establish physiological stability: monitor intake and output; oxygenation; blood chemistry, adequacy of hydration; use of sensory aids; pain management Review medications: monitor for high-risk drug interactions Reduce environmental risks: create a familiar	Foster nurses' (RNs and RPNs) care strategies for older adults with delirium in diverse settings inclusive of LTC through implementation of tailored recommendations

Lead Author (publication year), location	Recommended interventions for delirium prevention and management	Supplementary details to guide practice	Goal
		environment; provide structure and predictable routine Application of knowledge: participate in professional development; provide delirium education to older adults and family Communication: enact therapeutic presence and emotional support Manage behaviour: consistent staffing; predictable routine; screen, assess and reduce the need for restraints	

Clegg's (2014) recent meta-analysis was undertaken to assess the effectiveness of single and multicomponent interventions for preventing delirium in older people residing in LTC. This review included two randomized control trials (RCTs) with a combined sample of 3636 older adults. Both RCTs exclusively addressed single component interventions for delirium prevention. The later trial (Lapane, Hughes, Daiello, Cameron, & Feinberg, 2011) examined the utility of implementing a proactive medication profile review using an electronic clinical informatics tool, called the Geriatric Risk Assessment MedGuide. Given the emphasis on pharmacological management, the intervention described falls outside the inclusion criteria of this scoping review, and thus is excluded from Table 11. The earlier trial (Culp et al., 2003) focused on a non-pharmacological, individualized hydration management intervention to reduce the incidence of delirium. The intervention focused on the individualization of adequate hydration through the calculation of ideal fluid intake based on their body weight. No effect on delirium incidence was reported for the sample of 98 residents residing in seven nursing homes over a four month period of time.

Table 11: *Systematic review of non-pharmacological prevention of delirium in persons residing in LTC*

Lead Author (publication year), location	Intervention for delirium prevention	Outcome
Clegg (2014), UK	Hydration-based intervention Training of nursing staff regarding implementation of hydration intervention Individual body weight used to calculate fluid intake goal 75% of fluid intake scheduled with meals	Hydration intervention described had no effect on delirium incidence (risk ratio = 0.85; 95% confidence interval, 0.18 to 4.00)

The ten primary studies that examined non-pharmacological prevention and management of delirium in persons in LTC are presented in Table 12. Those authors most frequently holding authorship, either as lead or co-author, within this body of work included Dr. Philippe Voyer, Dr. Kennith Culp, and Dr. Najma Siddiqui. Dr. Voyer, a Canadian nurse researcher was involved in four publications dating back to 2008, representing 40% of all included studies. Dr. Culp, also a North American nurse researcher, was involved in three of the four earliest publications dated between 1997 and 2003, representing 30% of all included studies. Dr. Siddiqi, a health researcher in the United Kingdom who authored two single studies in 2008 and 2011, represents 20% of the included publications.

This body of work included a number of approaches for the prevention and management of delirium. These included, in descending frequency: implementation of a hydration management intervention (n = 3); determine staff detection of delirium (n = 3); implementation of a program for staff education about delirium (n = 2); implementation of a program to prevent delirium (n = 1); and assessment for modifiable delirium risk factors (n = 1). There were two broad groupings of specific interventions detailed in the included studies. Three studies focused on a single intervention to promote positive patient outcomes through hydration protocols. The majority of the studies (70%) identified interventions aimed towards supporting the role of staff in caring for the older adult at risk for delirium predominantly through education, organizational practices, and risk detection.

Hydration. Hydration as a term was mentioned in all of the ten studies. In some studies, it was an aspect of the teaching plan (Siddiqi, Young, Cheater, & Harding, 2008; Voyer et al., 2014); in others, it was identified as a modifiable risk factor(Culp et al., 1997; McCusker et al., 2013); and in three studies published in the early 2000s, a hydration intervention was measured (Culp,

Mentes, & Wakefield, 2003; J. C. Mentes & Culp, 2003; S. B. Robinson & Rosher, 2002). In the Culp et al. (2003) study, the four-week weight-based intervention involved 98 American residents from seven LTC facilities. The mean age of the treatment group was 84.5 years. Each resident's fluid intake goal was determined on the individual's weight. To reach fluid intake goals, much of the fluid intake (75%) was to occur with meals. Using the same weight-based calculation to determine a fluid intake goal, Mentes and Culp (2003) implemented strategies to provide adequate hydration over an eight week period to 49 residents, with a mean age of 80.6 years. The strategies are presented in greater detail in Table 13. Robinson and Rosher (2002) studied a hydration program involving 51 older adults with a mean age of 83.5 years. This program was unique in that it involved a dedicated hydration assistant, who using novel individualized strategies aimed to increase a resident's fluid intake by 16 ounces per day. Common to the three studies examining a specific hydration intervention, no statistically significant evidence was found regarding the intervention and prevention or management of delirium.

Risk detection. Voyer et al. (2008) suggested that nurses' ability to detect symptoms of delirium and label them as such was key to the mitigation of adverse outcomes. These authors found that nurses readily recognized individual symptoms, typically associated with delirium, such as disorganized speech, easily distracted, restless, lethargy, and fluctuations in mental functioning. Nurses in this study, however, detected the risk for delirium in less than 20% of cases. Further, the chance of undetected delirium was four times greater in residents over 85 years of age. More recently, Voyer and associates' (2012) investigation of detection of delirium by nurses was 51% for a population of 280 residents. Detection was significantly more likely if the resident also presented with depressive symptoms. The findings of Culp et al.'s (1997)

earlier work suggests that low delirium detection rates by nurses is not a new phenomenon. In this study, detection was approximately one quarter of all cases of delirium. Collectively these findings support the pattern of under-detection of delirium symptoms despite the use of a standardized tool, the Confusion Assessment Method (CAM).

Education. Three of the ten studies addressed various educational approaches for clinicians regarding the prevention or detection of delirium. Voyer et al. (2014) studied a two phase Delirium Prevention Program (DPP). The first phase was education of staff using a variety of teaching modalities. The second stage involved staff's enactment of this knowledge, in particular, the identification of delirium risk factors, as well as program evaluation. Siddiqi et al. (2011, 2008) described the creation of a multicomponent delirium prevention program which involved consultation with clinicians and an evaluation regarding feasibility of implementation. The final program was entitled 'Stop Delirium!' An early aspect of program development included vetting of relevant evidence and program content by key LTC stakeholders to strengthen its applicability to practice. The involvement of a delirium champion, external to the setting, was responsible for educating, training, motivating, liaising, and facilitating staff working groups. Areas for ongoing improvement included communication among staff; addressing delirium risk factors; and managing organizational resources and structures. Overall, the results of the educational initiatives described in the three primary studies were not exclusive to the prevention and management of delirium. None of these studies measured the efficacy of the respective programs in the prevention of delirium. All authors, however, suggested that continuing staff education was an important aspect of care of older persons residing in LTC.

The authors of this body of evidence did not report any statistically significant findings regarding non-pharmacological interventions on the prevention and management of delirium.

Despite the absence of new evidence to guide practice, most authors acknowledged the potential merit of intervening in relation to eight modifiable risk factors for delirium (Table 12). What remains unknown is the efficacy of reported interventions for delirium in the reviewed evidence.

Table 12: *Acknowledgement of modifiable delirium risk factors by author (n=10)*

Author	Dehydration	Sensory impairment	Environment	Altered stimulation	Acute illness	Unmanaged pain	Physical restraints	Medication regime
Voyer (2014)	X	X					X	X
McCusker (2013)	X	X	X	X			X	
Voyer (2012)	X				X	X	X	X
Siddiqi (2011)	X			X	X			
Siddiqi (2008)	X	X			X	X		
Voyer (2008)	X	X			X	X	X	X
Culp (2003)	X							
Mentes (2003)	X							
Robinson (2002)	X							
Culp (1997)	X		X		X	X		X

Table 13: *Primary studies addressing non-pharmacological prevention and management of delirium in persons residing in LTC (n=10)*

Lead Author (publication year)	Overall approaches	Specific interventions for delirium prevention and management	Reported findings relative to intervention
Voyer (2014)	Prevent delirium among cognitively impaired residents through implementation of the Delirium Prevention Program	Two-phase Delirium Prevention Program (DPP) Phase one included the development of four tools including: 1) instruction manual, 2) toolkit, 3) PowerPoint presentations and 4) a decision tree. The decision tree included a 5-item screening tool for identification of high risk residents. If identified as high risk, nurses were prompted to apply a protocol for optimal stimulation; evaluation of 4 modifiable delirium risk factors (use of physical restraints, antipsychotics, dehydration, and visual impairments); and selection of a specific intervention to minimize the impact of existing risk factors Phase two involved staff training, implementation of the DPP, and interviews with staff regarding program implementation, and DPP revision based on feedback	The DPP was feasible and acceptable with modifications It is necessary to limit the number of interventions related to any one of the 4 modifiable delirium risk factors to promote clarity for the different health care providers Practical training and memory prompts (such as posters, logos, acronyms, pictures, and pamphlets) were necessary to support nurses use of the DPP No determination of DPP efficacy in preventing delirium
McCusker (2013)	Identify baseline vulnerability for delirium	Monitor changes in severity of delirium over a 6-month period Determine association of delirium with modifiable environmental and other risk factors. Environmental factors included: presence of personal belongings, stimulation, orientation aids, visual aids, hearing aids, physical restraints including bedrails, accessible glass of water, presence of family member, visibility of staff from resident's door way Other variables assessed where pharmacological treatments	Six potentially modifiable risk factors were associated with an increase in delirium severity: - Absence of reading glasses - Disorientation - Absence of family - Dehydration - Bedrails - Use of other restraints
Voyer (2012)	Decrease adverse outcomes for elderly in LTC through nurses' accurate assessment/recognition of delirium	Nurse detection of delirium and ten delirium symptoms over a 6 month period (acute onset, fluctuation, inattention, disorganized thinking, altered consciousness, memory, perceptual disturbance, disorientation, hyperactivity, hypoactivity)	Delirium detection rates by nurses ranged from 25% to 67% in comparison to specially training research assistants Fluctuating symptoms during the course of a day compromised detection of delirium Presence of increased depressive symptoms increased the rate of delirium detection

Lead Author (publication year)	Overall approaches	Specific interventions for delirium prevention and management	Reported findings relative to intervention
Siddiqi (2011)	Increase staff knowledge to positively impact attitudes and practices for delirium management	Education offered to staff regarding the multicomponent "Stop Delirium!" program implemented in six care homes over a ten month period	The identified themes: Importance of knowing the resident as an individual Professional development relative to the intervention valued by staff Education positively impacted awareness of risk factors for delirium Optimizing organizational structure and staffing can support implementation of the intervention (ongoing education, communication of concerns and designated trainers)
Siddiqi (2008)	Prevent and manage delirium of older residents in care homes	Over a 6 month period: - Design a multicomponent intervention targeting risk factors for delirium - Introduce a delirium practitioner as an intervention facilitator - Develop an education package for staff - Create staff working groups with a local champion - Liaise with other professionals - Audit implementation Program content: - Determine visual/hearing impairment - Change physical environment (adequate lighting/clear signage) - Hand-washing policies - Pharmacist-led medication review - Screening for early detection of delirium Practice changes implemented included: introduce shift to shift "handover' time; fluid balance chart modification; delirium poster; information pamphlet on delirium and dehydration for residents and relatives; delirium checklist to support communication between staff and physicians	Intervention was designed and delivered High staff participation in at least one training session (91%); positive rating of education by staff Areas to address for improved delirium care: - Communication between physicians and staff - Dehydration prevention - Catheter care - Prevention of constipation - Pain management - Environmental management Accessing the delirium practitioner by staff for advice on medication administration and managing challenging resident behaviours occurred particularly during training sessions

Lead Author (publication year)	Overall approaches	Specific interventions for delirium prevention and management	Reported findings relative to intervention
Voyer (2008)	Determine delirium detection rates by nurses	Nurse detection of delirium and six delirium symptoms (easily distracted; periods of altered perception; disorganized speech; periods of restlessness; periods of lethargy and variable mental function throughout the day) among residents with dementia over a one week period without specialized training on delirium and dementia	The detection of individual delirium symptoms by nurses in comparison to the research team members occurred more easily and rapidly for the following three symptoms: disorganized speech, distraction, and variability in mental function Nurses, however, were only able to identify less than 19% of delirium cases in comparison to specially training research team members Residents with advanced age, particularly over 85 years, were associated with undetected delirium
Culp (2003)	Decrease incidence of acute confusion using a hydration management intervention	Implement a weight-based hydration management intervention to a treatment group for a four week period Experimental group – older individuals received assistance to meet their individualized fluid intake goal. Individualized fluid intake goal was calculated based on weight: 100ml/kg for the first 10kg, 50ml/kg for next 10kg, and 15ml for the remaining body weight Control group – older individuals received routine care	No difference in the incidence of acute confusion between the treatment and control groups
Mentes (2003)	Prevent or manage episodes of acute confusion, respiratory, and urinary tract infections through a hydration management program	Eight-week hydration management intervention for a treatment group of 25 residents Treatment group - Individual fluid goals were calculated as follows: 100 ml/kg for the first 10kg, 50ml/kg for next 10kg, and 15ml for the remaining body weight; promotion of adequate fluid intake occurred as follows: six ounces of fluid intake with medication; fluid rounds morning and evening; and “happy hours” or “tea time” twice weekly Control group – individuals received standard nursing care	Treatment group was more frail and cognitively impaired than the control group at the onset and conclusion of the study Non-statistical finding: treatment group had 50% fewer hydration linked events than members of the control group including: - Episodes of acute confusion - Upper respiratory - Urinary tract infections - Pneumonia - Influenza

Lead Author (publication year)	Overall approaches	Specific interventions for delirium prevention and management	Reported findings relative to intervention
Robinson (2002)	Prevent dehydration associated conditions (delirium, urinary tract infections, respiratory infections, falls, skin breakdown, and constipation) through delivery of a hydration intervention	Nine-week hydration intervention as follows: Each resident had an individualized care plan for hydration that included a minimum daily fluid intake of 1500ml with the addition of two eight-ounce glasses per day A hydration assistant focused on getting residents to drink Replacement of institutional grey beverage cart with a purple and yellow cart to enhance the visibility of this equipment to elderly residents; coloured carts contained colourful cups and the following beverages: juices, milk, milkshakes, lemonade, flavoured iced teas, decaffeinated soda, decaffeinated coffee, tea, hot chocolate, and apple cider	Total body water increased significantly Significantly improved outcomes included: - Increase in number of bowel movements - Reduction in laxative use - Decreased number of falls
Culp (1997)	To assess nurses' ability to detect acute confusion cases	Adoption of a diagnostic algorithm to screen for acute confusion in a two week period During the two weeks, a trained registered nurse research assistant regularly administered the NEECHAM. If the NEECHAM score was <25, a Mini-Mental Status Exam (MMSE) was performed. When the MMSE was less than the baseline score, the Confusion Assessment Method was used	All positively screened residents with acute confusion had symptoms during the first six days and no new residents were identified during the second week The common risk factors of the residents detected as having acute confusion had compromised cortical functioning, poor fluid intake, were taking high risk medications, and had urinary infections Staff nurses were able to detect 27% of the cases of delirium

Chapter 5

Discussion & Conclusion

The purpose of this scoping review was to examine the nature of evidence pertaining to non-pharmacological nursing interventions for the prevention of delirium for older adults residing in LTC facilities. Much of the evidence regarding prevention of delirium has been generated within acute care contexts. A plethora of such research has facilitated the systematic evolution of practice protocols. Following the standardization of a profile of delirium, inclusive of risk factors and clinical characteristics, non-pharmacological multicomponent approaches to delirium prevention and management have been instituted in acute care practices. Additionally, clinical instruments for screening, diagnostic, and severity have been established and validated. Overall, this body of work, which spans two decades of research, offers evidence-informed pathways for prevention and management of delirium in acute care.

Inouye's seminal and subsequent studies have shaped the development of guidelines regarding critical risk factors within a multicomponent intervention approach. The most widely referenced intervention model was HELP. No full studies of this program within LTC settings, however, could be found. Work is emerging in this context as indicated in the publication of three abstracts led by Boockvar (2016, 2015, and 2014) and co-authored by Inouye. These abstracts refer to an adapted HELP for LTC residents. Overall, initial findings support the feasibility of this model for delirium remission and cognitive functional improvement. Full details of this emerging work were not available within the searched databases. Boockvar et al.'s work however, offers promise that evidence will soon be available to guide practice situated within the uniqueness of LTC settings.

The anticipated evidence regarding multicomponent interventions for delirium is forthcoming. Knowledge creation, dissemination, translation and uptake of such evidence, however, are restricted by the timelines in which these processes will occur. In the interim, while these processes unfold, this scoping review found that researchers, LTC organizations, and clinicians have undertaken single-component interventions to address delirium. Although such interventions have often been extracted from the multicomponent strategies yielded from acute care settings, they do not align with the multifaceted approach for delirium prevention and management. In addition, transferability of evidence generated in acute care contexts is particularly challenging given the nuanced uniqueness of the LTC settings which include, but are not limited to availability of resources, credentialing of clinicians, staffing ratios, resident profiles, and organizational culture. At present, clinicians providing care to elderly residents in LTC continue to experience a dearth of context-specific evidence to guide their practice in delirium prevention.

Two evidence-based clinical practice delirium guidelines were identified in this scoping review. Both guidelines, NICE and RNAO, focus on strategies for identification of, and interventions tailored to delirium risk factors. The NICE guideline specifically examined studies conducted in LTC settings. The RNAO recommendations referred to the adoption of evidence generated in acute care settings to LTC residents. A shared emphasis on the detection and mitigation of risk factors has utility for directing LTC health care providers' practices. To benefit from this knowledge, however, warrants leadership, progressive organizational practices, funding, and an engaged workforce (Canadian Healthcare Association, 2009). To this end, delirium prevention 'change champions,' with knowledge translation skills, have the potential to facilitate the uptake of the recommended practices within LTC. Through the implementation of

diverse strategies, champions have been found to effectively promote changes in practices in LTC (Kaasalainen et al., 2015).

Cacchione (2002) supported the implementation of a 'delirium champion,' a trained health care provider available to complete delirium screening for any resident who is deemed to be a high risk for delirium or has had a recent change in cognitive status. Delirium champions generally are nurses who are motivated, have a strong interest in gerontology and have the ability to collaborate with both frontline staff and administrators (Yevchak et al., 2014). Delirium champions receive advanced education so they can serve as an 'expert' within LTC facilities. These individuals facilitate and provide best practice geriatric care by utilizing the 'train the trainer' approach. More recently, Middle et al. (2015) found that this role was associated with positive patient outcomes secondary to increased delirium knowledge and skills of the provider. As LTC has limited financial means, this model has been attractive specifically to this setting as it utilizes existing staff resources (J. Mentes, Culp, Maas, & Rantz, 1999). If a LTC facility desires to proceed with the 'delirium champion' model, clear roles and responsibilities specific to this champion position should be documented within the organization's policies and procedures to provide clarity to their colleagues of the purpose and function of their role.

A single systematic review of non-pharmacological, multicomponent interventions for delirium in LTC (Clegg et al., 2014) was included in this scoping review. The single studies included in this systematic review were not multicomponent in nature. The impact of two different single individualized, weight-based hydration intervention trails involving 3,636 participants yielded mixed findings partly attributed to the quality of the evidence. Clegg and colleagues identified the need for more rigorous research in this area for the purpose of informing practices with elderly residing in LTC.

Other authors (Culp, Mentes, & McConnell, 2001; Ouslander & Schnelle, 1993) also identified the need for experimental designs to determine the effectiveness of multicomponent delirium interventions involving larger samples across multiple LTC facilities. Not only is contextually situated research warranted, researchers must also be mindful of methodological, ethical and moral strategies with regards to involving vulnerable older adults. There are current empirical and clinical debates about the inclusion of persons with a pre-existing cognitive impairment or a prior cognitive impairment as research participants. From a risk/harm perspective, some contend that research with persons with altered cognition must first consider its benefits for the group to be served as well as its scientific and social value (Liamputtong, 2007). Moral sensitivity, according to Liamputtong, is a critical research process element for optimizing the relational and contextual protection of vulnerable populations.

Across the ten primary studies in this scoping review, the grouped findings align with three foci; hydration, risk detection, and education. In the three single-hydration intervention studies, two of which were authored by the same research team, increasing the availability and choice of fluids did not demonstrate an effect on delirium prevention or management. Although, the efficacy of the two different interventions remains unknown, the researchers' identified such study limitations as small sample sizes and the presence of study bias. Further, recent evidence supports serum osmolarity rather than urinalysis as the preferred biochemical proxy for dehydration in older adults (Bunn, Jimoh, Wilsher, & Hooper, 2015).

Collectively, detection of delirium risk factors findings in this scoping review suggest that nurses can readily identify alterations in one component of a resident's health profile. Yet, this information does not necessarily translate to a consideration of a nursing diagnosis of acute confusion, based on a constellation of multiple factors. One strategy to improve nurses'

recognition of delirium is to encourage attention to a constellation of multiple factors indicative of acute confusion through the use of a brief, validated and convenient clinical screening instrument (Adamis, Sharma, Whelan, & Macdonald, 2010; O'Hanlon et al., 2013). Practical considerations for implementing any screening instrument within the often highly structured and routine practice of LTC, for both regulated and unregulated health care providers, is intentionality and seamless integration. In this scoping review, the intentional, seamless, and pragmatic implementation of such screening tools falls short of identifying the frequency of delirium screening. In the literature, frequency of screening varies widely, from daily to annually (Han et al., 2009; Laplante & Cole, 2001; Morley, 2008). This variability may be attributed to the intersection of diverse variables including resident, provider, structural, and provincial policies. Cacchione (2002) suggested that improvement of delirium detection in LTC required the involvement of all levels of nursing staff in the selection of an appropriate clinical screening instrument and the development of prevention protocols.

There is a volume of literature about various delirium screening instruments used by multiple disciplines in LTC (Csokasy, 1999; Gagnon et al., 2012; Khan et al., 2012; Mattison et al., 2014; Schuurmans, Deschamps, Markham, Shortridge-Baggettt, & Duursma, 2003; van Gemert & Schuurmans, 2007). Adamis et al. (2010) found that many of the 24 instruments measuring or detecting delirium were researcher-designed and lacked psychometric testing. Of particular clinical interest is the NEECHAM, used in the included studies of Culp et al. (2003, 1997) and Mentes et al. (2003). This observational nine-item tool, developed by nurses (Cacchione et al., 2003; Milisen et al., 2005; Neelon, Champagne, Carlson, & Funk, 1996), is designed to rapidly assess the risk, presence, and severity of acute confusion. An added feature of this tool is minimal response burden for the resident. During routine care, the nurse is

required to engage the resident in a ten minute conversation for the assessment of responsiveness, behaviour, and physiological status specific to heart rate, oxygen saturation, respiratory rate, blood pressure, and incontinence status. It has been suggested that over-screening for delirium may be distressing for both residents and nurses, especially when there is debate about the benefits of physiological parameters as an aspect measuring acute confusion (Adamis et al., 2010; Smith et al., 1995). Further, regular use of this screening instrument may be challenging in LTC secondary to established vital sign scheduling, high staff turn-over, inconsistent staffing, increased workload, and resident to nurse ratio.

In addition to the undetermined frequency of screening, the results of the scoping review did not yield information specific to when to screen for delirium in LTC. Given hospital pressures, it is estimated that 30 to 90% of older adults are discharged from acute care directly into a LTC facility with an incomplete resolution of delirium (Bond, 2009; Farley & McLafferty, 2007; Faught, 2014; Field & Wall, 2013; Givens, Jones, & Inouye, 2009). Faught et al. (2014) found that approximately 15% of elderly discharged from hospital with unresolved delirium continued to be delirious for up to six months. Therefore, this scoping review did not yield information regarding the essential nature of delirium screening prior to or post-transition between health care settings. As mentioned earlier, the benefit of a scoping review is the systematic aggregation of what is known about a topic while showcasing what remains unknown (Arksey & O'Malley, 2005; Brien et al., 2010; Levac et al., 2010).

Based on the findings of this scoping review, limited information was provided about the sensitivity and specificity of the selected delirium screening measures. These two attributes are particularly relevant given delirium's fluctuating nature. A Nursing Home - CAM is embedded in the provincially mandated 450-item tool known as the Resident Assessment Instrument -

Minimum Data Set (RAI-MDS) (McCusker et al., 2011). It provides prognostic information based on the presence, severity, and changes with regards to the following behaviours: inattention, disorganized thinking, altered level of consciousness, and psychomotor retardation. Yet, the scheduled collection of such information may not be done by those most responsible for the daily care of residents. Thereby, those completing daily care may not contribute comprehensive and updated baseline data to which assessment of emergent alterations in cognition or behaviour may be compared. Saliba et al. (2012) suggested that a compliment to the Nursing Home – CAM delirium items, could involve adoption of evidence informed delirium detection protocols. Otherwise, under-detection of delirium may continue to be a problem given the time-intensive efforts required for the nurse to integrate multiple sources of information including cognitive assessment, co-morbidities, patient observation, information from clinical staff, family and/or caregivers, physical examination, and medication profile (Bond, 2009; Inouye et al., 2014; Lawlor & Bush, 2014; Levkoff et al., 1991; McCusker et al., 2011).

A shared finding in this scoping review was early intervention to mitigate or modify sensory, lung, respiratory, nutritional, elimination and mobility risk factors. This may be particularly challenging, however, if the provider does not know the resident as a unique individual and care practices are underpinned by misinformation about risk factors. As such, it is not surprising that the results of the three single studies examining different educational protocols to promote delirium prevention were positive. Voyer et al. (2014) encouraged the involvement of frontline staff in program design, an empowering process promoting intervention sustainability and anti-ageism (Dahlke & Phinney, 2008; DeCrane, Culp, & Wakefield, 2012; Farley & McLafferty, 2007; Inouye et al., 1990; Li, Giles, Dumont, Day, & Higgins, 2009; Vreeswijk et al., 2009).

Given the amount of time both personal support workers and nurses spend at the bedside of individuals in LTC, they are well-situated to observe subtle changes in the residents' behaviour and cognitive changes which may be suggestive of delirium (Day et al., 2009; Middle & Miklancie, 2015; Milisen et al., 2005; Peacock, Hopton, Featherstone, & Edwards, 2012; Sendelbach & Finch-Guthrie, 2009). To strengthen their delirium prevention knowledge and skills, Middle and Miklancie (2015) suggested that the provision of mandatory certification in delirium, similar to the required for cardiopulmonary resuscitation, would be of benefit. Further, the development and implementation of a uniform delirium education package that is delivered during the basic training of all LTC providers may be guided by that of the respected Gentle Persuasion Approach (GPA) training. Future research questions may include: What educational methods particular to the topic of non-pharmacological multicomponent interventions are most appropriate for the staff mix of LTC facilities? Who is responsible for delivering the education? What is the duration and frequency of educational sessions to optimize nurses' confidence? Are there differences in patient- and staff-outcomes for groups involved with a delirium champion compared to their counterparts? How does the educational approach compare to those used in acute care? In addition, development of delirium prevention educational protocols offers opportunities for inter-sector collaborations between acute care, long term care, and educational institutions.

Limitations

A possible limitation of this scoping review was the intentional delay of the stage involving consultation with key stakeholders. Although this stage will occur subsequent to this thesis work, earlier implementation could have provided a more timely opportunity to dialogue about the findings and their applicability to practice. In particular to my LTC work setting,

numerous resident orientation practices are implemented as a mental health strategy. As supported by the literature, these include informing the individual of the day of week/month/time/place, utilization of therapeutic communication, providing a clock or calendar, reducing sensory impairment by ensuring they have any vision or hearing aids, engagement with other people, and providing meaningful and familiar objects (Day et al., 2011; Gagnon et al., 2012; Kratz, 2008; Lundstrom et al., 2005; Neville, 2006). Such approaches were also identified in the two guidelines, educational packages, and some of the primary studies. Yet, due to the paucity and heterogeneity of the included studies, I was unable to critically assess an assertion that validation rather than orientation strategies may be more therapeutic for older adults with pre-existing cognitive impairment and delirium (Day et al., 2011).

Further, there was limited information pertaining to working with families in the reviewed studies. Although Rosenbloom-Burnton et al. (2010) determined that engaging families in the prevention of delirium in the acute care setting is feasible, research needs to be completed in the LTC setting to determine whether this intervention is transferrable with similar outcomes. Another acute care guideline recommends that available family members remain at the bedside of an individual experiencing delirium to be a calming presence, assist them, and help re-orientate them (Schofield, 2008). Not only can family involvement empower them to be active participants in the resident's care planning and decision making, but family members can offer clinicians a large volume of information surrounding the usual behaviours and functioning of their loved ones (Miller, Campbell, Moore, & Schofield, 2004; Rosenbloom-Brunton et al., 2010). As previously discussed, the scoping review indicated that delirium education is of benefit to clinical staff. This scoping review does not draw parallels to the merit of family

education during and following a delirious episode as identified in the acute care literature (Coulson & Almeida, 2002; Gagnon et al., 2012; Irwin et al., 2013).

Conclusions

Older adults residing in LTC facilities present with multiple precipitating and predisposing risk factors thus placing them at heightened risk for the development of delirium. Two guidelines, one systematic review, and ten primary studies regarding delirium prevention specific to LTC were identified as relevant to the posed purpose of this scoping review. Much of this evidence pertained to the efficacy of a single non-pharmacological intervention rather than a multicomponent approach, which is widely accepted in the reviewed acute care evidence. Collectively, hydration, risk detection, and education offer preliminary descriptive knowledge about foci for delirium prevention. This is in stark contrast to the established body of work regarding non-pharmacological multicomponent approaches in acute care. Advanced practice nurses working in LTC have the potential to coordinate human, professional, financial, and organizational resources for the mitigation of risk factors and early detection of delirium among elderly persons.

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Appendix A: Literature Search Strategies

Table 14: *April 14, 2016 record of search for evidence published between August 26, 2015 – April 14, 2016*

Search Terms	CINAHL	OVID	Proquest	Campbell	EBMZ	Medline	PubMed	Psyc INFO	Joanna Brigg's
Deliri*; long term care; interven*	1 (1)	0	2	-	2	1	11	1	4
Deliri*; long term care facili*; interven*	0	0	0	-	0	0	0	0	1
Deliri*; nursing home; interven*	1	0	0	-	0	0	4	0	1
Deliri*; interven*; post acute	0	0	2	-	0	0	7	0	0
Deliri*; multi component interven*	0	0	0	-	1	0	1	0	0
Deliri*; multicomponent interven*	1	0	2	-	0	0	3	0	0
Acute confusion*; long term care; interven*	0	0	0	-	0	0	2	0	0
Acute confusion*; long term care facili*; interven*	0	0	0	-	0	0	0	0	0
Acute confusion*; nursing home; interven*	0	0	0	-	0	0	1	0	0
Acute confusion*; multi component interven*	0	0	0	-	0	0	0	0	0
Acute confusion*; multicomponent interven*	0	0	1	-	0	0	2	0	0
Manag*; deliri*; post acute	0	0	6	-	0	0	4	0	0
Treat*; deliri*; post acute	0	0	6	-	0	0	9	1	0
Manag*; deliri*; nursing home	0	0	2	-	0	0	4	1	1
Manag*; deliri*; long term care	0	0	8	-	0	0	11	1	2
Manag*; deliri*; care home	1	0	4	-	0	0	7	2	0
Treat*; deliri*; long term care	0	0	8	-	0	0	11	1	4
Treat*; deliri*; nursing home	0	0	1	-	0	0	6	2	1
Treat*; deliri*; care home	1	0	4	-	0	0	2	3	0
Interven*; deliri*; (nursing home* or long term care or care home*)	2	0	2	-	0	1	13	2	4
Manag*; deliri*; (nursing home* or long term care or care home*)	1	0	2	-	0	0	16	3	2
Treat*; deliri*; (nursing home* or long term care or care home*)	1	0	2	-	0	0	23	4	4
Deliri*; long term care; preven*	2 (1)	0	1	-	0	1	17	3	1
Deliri*; long term care facili*; preven*	0	0	0	-	0	0	1	1	1
Deliri*; nursing home; preven*	1	0	2	-	0	0	7	1	1
Deliri*; preven*; post acute	0	0	2	-	0	0	5	0	0
Deliri*; preven*; care home	0	0	2	-	0	0	6	1	0

Search Terms	CINAHL	OVID	Proquest	Campbell	EBMZ	Medline	PubMed	Psyc INFO	Joanna Brigg's
Acute confusion*; long term care; preven*	0	0	0	-	0	0	2	0	0
Acute confusion*; long term care facili*; preven*	0	0	0	-	0	0	0	0	0
Acute confusion*; nursing home; preven*	0	0	0	-	0	0	1	0	0
Acute confusion*; care home; preven*	0	0	0	-	0	0	1	0	0
Deliri*	72	0	138 (1)	0	0	1	608	110	4

* = Abbreviated term ( ) = New title - = Terms not entered in database

Table 15: *August 29, 2015 search for delirium prevention evidence in long term care (no limit on year of publication)*

Search Terms	CINAHL	OVID	Proquest	Campbell	EBMZ	Medline	PubMed	Psyc INFO	Joanna Brigg's
Deliri*; long term care; preven*	49	19	45	-	6	1	104	31	19
Deliri*; long term care facili*; preven*	9	5	7	-	0	0	9	8	13
Deliri*; nursing home; preven*	21	20	16	-	3	1	82	35	20
Deliri*; preven*; post acute	2	3	8	-	1	0	29	5	6
Deliri*; preven*; care home	13	7	33	-	1	0	74	39	4
Acute confusion*; long term care; preven*	2	0	5	-	0	0	48	2	4
Acute confusion*; long term care facili*; preven*	0	0	0	-	0	0	5	0	1
Acute confusion*; nursing home; preven*	2	1	2	-	0	0	33	4	3
Acute confusion*; care home; preven*	1	0	3	-	0	0	25	5	0

* = Abbreviated term - = Terms not entered in database

Table 16: *September 8, 2014 record of search for evidence published between January 1, 2014 to September 7, 2014*

Search Terms	CINAHL	OVID	Proquest	Campbell	EBMZ	Medline	PubMed	Psyc INFO	Joanna Brigg's
Deliri*; long term care; interven*	2 (1)	75 (6)	238 (3)	-	4	-	7	38 (2)	-
Deliri*; long term care facili*; interven*	1 (1)	27	28	-	2	-	1	8	-
Deliri*; nursing home; interven*	2 (1)	-	36	-	10	-	5	25 (1)	-
Deliri*; interven*; post acute	0	-	-	-	-	-	-	13 (1)	-
Deliri*; multi component interven*	2 (1)	6	23 (1)	-	5	-	2	8	-
Deliri*; multicomponent interven*	2 (1)	15 (4)	46 (1)	-	6	-	1 (1)	29 (1)	-
Acute confusion*; long term care; interven*	0	6	2	-	0	-	2	29 (1)	-
Acute confusion*; long term care facili*; interven*	0	4	1	-	0	-	0	8 (1)	-
Acute confusion*; nursing home; interven*	0	10 (1)	0	-	1	-	1	13	-
Acute confusion*; multi component interven*	0	0	1	-	0	-	0	1	-
Acute confusion*; multicomponent interven*	0	1 (1)	0	-	1	-	1	0	-
Manag*; deliri*; post acute	0	0	1	-	1	-	2	24 (2)	-
Treat*; deliri*; post acute	0	0	1	-	1	-	3	53 (4)	-
Manag*; deliri*; nursing home	-	106 (1)	3	-	5	-	3	-	-
Manag*; deliri*; long term care	-	0	3	-	4 (1)	-	7	-	-
Manag*; deliri*; care home	-	2	2 (1)	-	2	-	1	-	-
Treat*; deliri*; long term care	-	0	2	-	5	-	16	-	-
Treat*; deliri*; nursing home	-	1	0	-	8	-	6	-	-
Treat*; deliri*; care home	-	0	1	-	1	-	1	-	-
Interven*; deliri*; (nursing home* or long term care or care home*)	-	-	-	-	-	-	-	10 (1)	-
Manag*; deliri*; (nursing home* or long term care or care home*)	-	-	-	-	-	-	-	12 (2)	-
Treat*; deliri*; (nursing home* or long term care or care home*)	-	-	-	-	-	-	-	24	-
Deliri*	-	-	-	-	-	-	-	-	99 (11)

* = Abbreviated term ( ) = New title - = Terms not entered in database

Table 17: *March 24, 2014 record of search for evidence of multicomponent delirium prevention in long term care setting (no limit of year of publication)*

Search terms	CINAHL	OVID	Proquest	Campbell	EBMZ	Medline	PubMed	PsycINFO	Joanne Brigg's
Interven*; and (deliri*)[Subject]; and (nursing home* or long term care); not hospital*	16	-	-	-	-	-	-	-	-
Manag*; deliri*; (nursing home* or long term care or care home*); not hospital*	30	-	-	-	-	-	-	-	-
Treat*; deliri*; (nursing home* or long term care or care home*); not hospital*	23	-	-	-	-	-	-	-	-
Interven*; deliri*; post acute; not hospital	1	-	-	-	-	-	-	-	-
Manag*; deliri*; post acute; not hospital	0	-	-	-	-	-	-	-	-
Manag*; deliri*; post acute	3	-	-	-	-	-	-	-	-
Interven*; deliri*; post acute	4	-	-	-	-	-	-	-	-
Treat*; deliri*; post acute	4	-	-	-	-	-	-	-	-
Manag*; deliri*; (nursing home* or long term care or care home*)	-	2792	-	-	-	-	-	-	-
Deliri*; manag*; long term care	-	12	28	-	26	-	102	-	-
Deliri*; manag*; nursing home*	-	9	10	-	39	-	68	-	-
Deliri*; manag*; care home*	-	4	13	-	20	-	8	-	-
Deliri*; manag*; post acute	-	1	6	-	5	-	29	-	-
Deliri*; treat*; long term care	-	12	47	-	29	-	175	-	-
Deliri*; treat*; nursing home*	-	32	21	-	52	-	101	-	-
Deliri*; treat*; care home*	-	3	39	-	20	-	6	-	-
Deliri*; treat*; post acute	-	1	10	-	18	-	66	-	-

* = Abbreviated term - = Terms not entered in database

Table 18: *February 28, 2014 record of initial search for evidence of multicomponent delirium prevention (no limit on the year of publication)*

Search terms	CINAHL	OVID	Proquest	Campbell	EBMZ	Medline	PubMed	PsyclNFO	Joanna Brigg's
Deliri*; long term care; interven*	19	1157	970	-	16	13	75	-	-
Deliri*; long term care facili*; interven*	1	478	130	-	2	5	5	-	-
Deliri*; nursing home; interven*	50	-	153	-	25	27	62	-	-
Deliri*; multi component interven*	5	18	33	-	5	0	11	-	-
Deliri*; multicomponent interven*	17	90	20	-	10	13	25	-	-
Acute confusion*; long term care; interven*	0	169	445	-	3	1	23	-	-
Acute confusion*; long term care facili*; interven*	0	71	246	-	0	0	1	-	-
Acute confusion*; nursing home; interven*	-	222	166	-	6	1	23	-	-
Acute confusion*; multi component interven*	0	3	66	-	2	0	0	-	-
Acute confusion*; multicomponent interven*	1	30	16	-	4	0	10	-	-
Deliri*	-	-	-	0	-	-	-	-	-
Acute confusion*	-	-	-	0	-	-	-	-	-

* = Abbreviated term - = Terms not entered in database